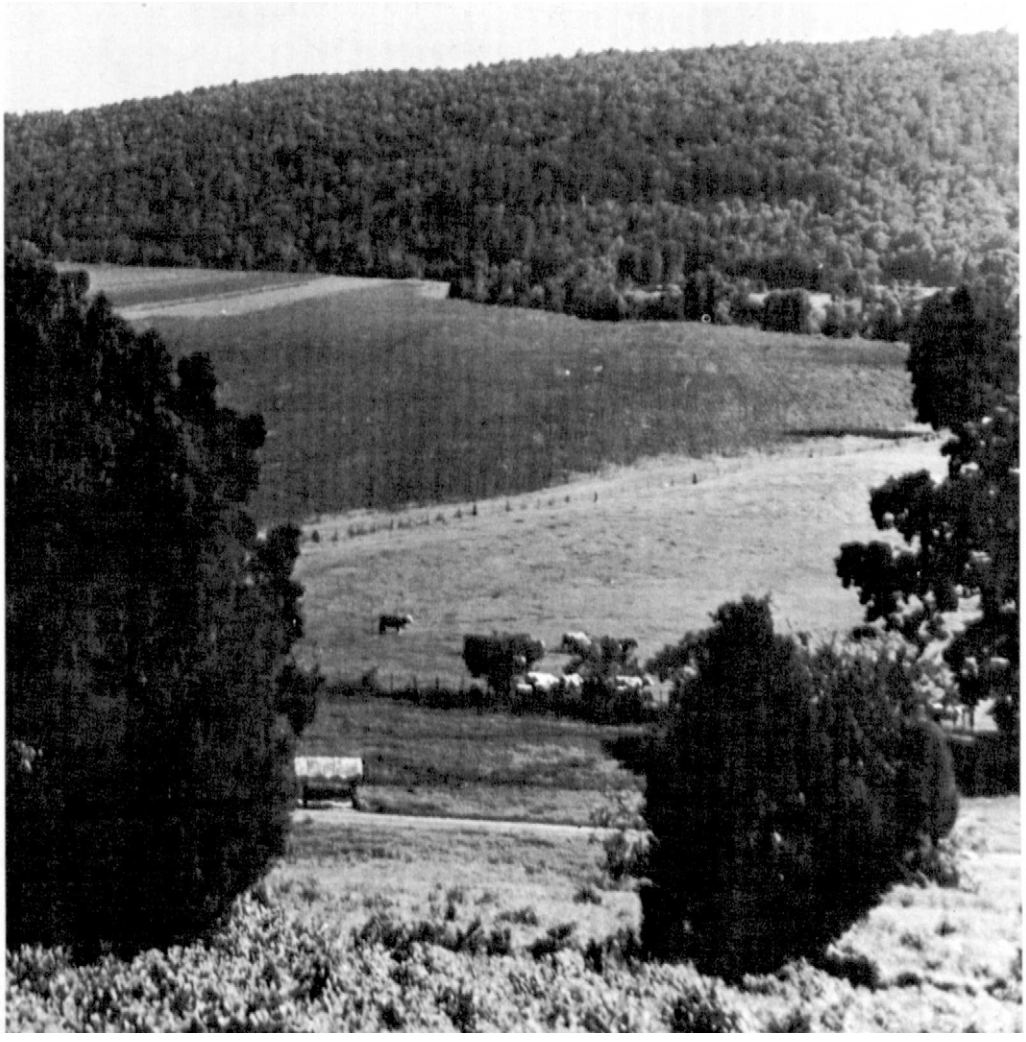
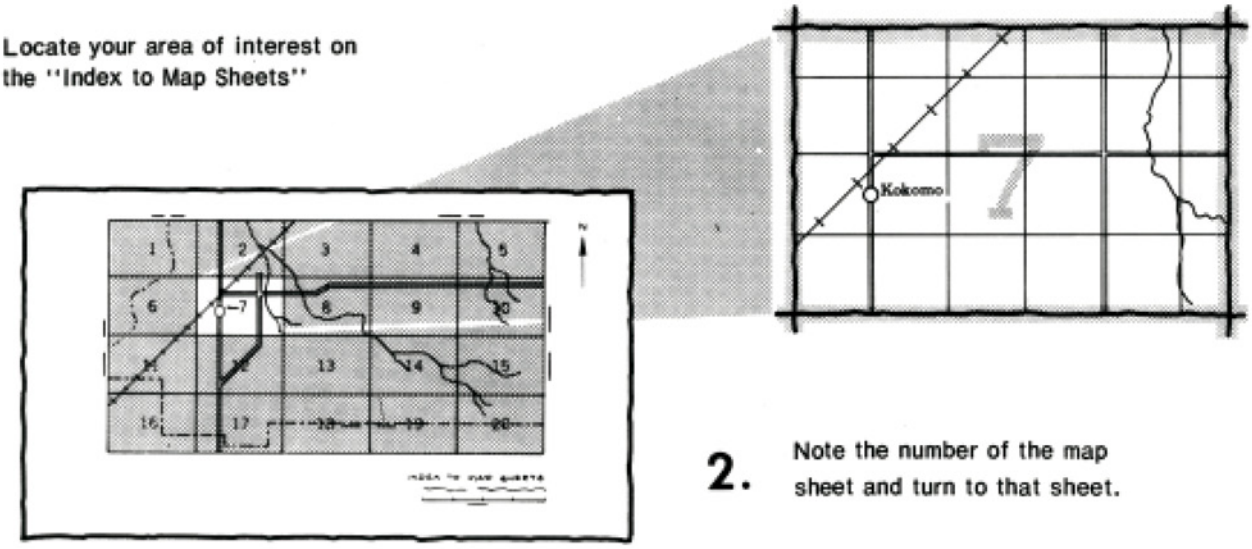
SOIL SURVEY OF
Perry County
Arkansas

United States Department of Agriculture
Soil Conservation Service and
Forest Service
in cooperation with
Arkansas Agricultural Experiment Station



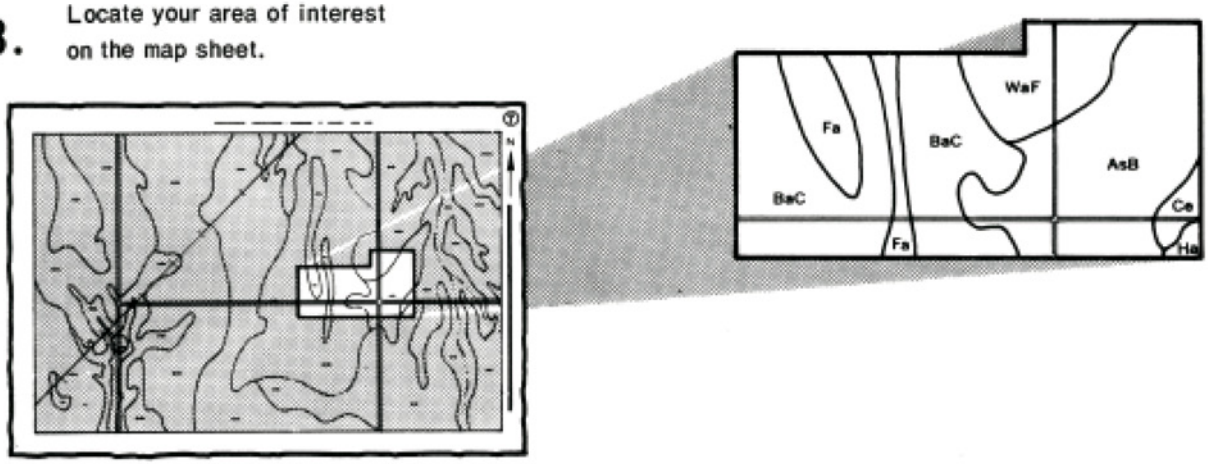
HOW TO USE

1. Locate your area of interest on the "Index to Map Sheets"

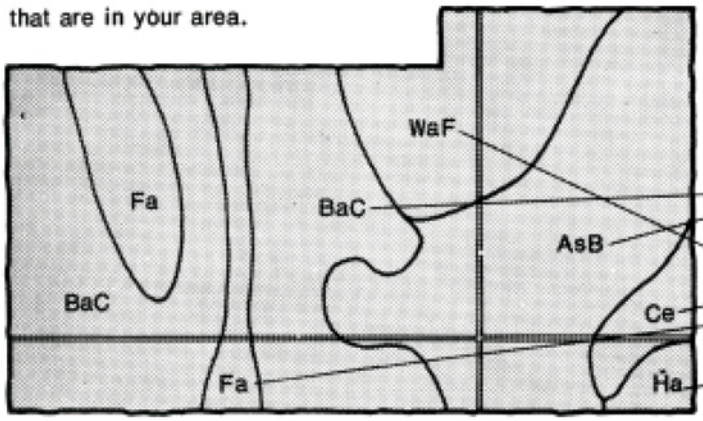


2. Note the number of the map sheet and turn to that sheet.

3. Locate your area of interest on the map sheet.



4. List the map unit symbols that are in your area.



Symbols

AsB
BaC
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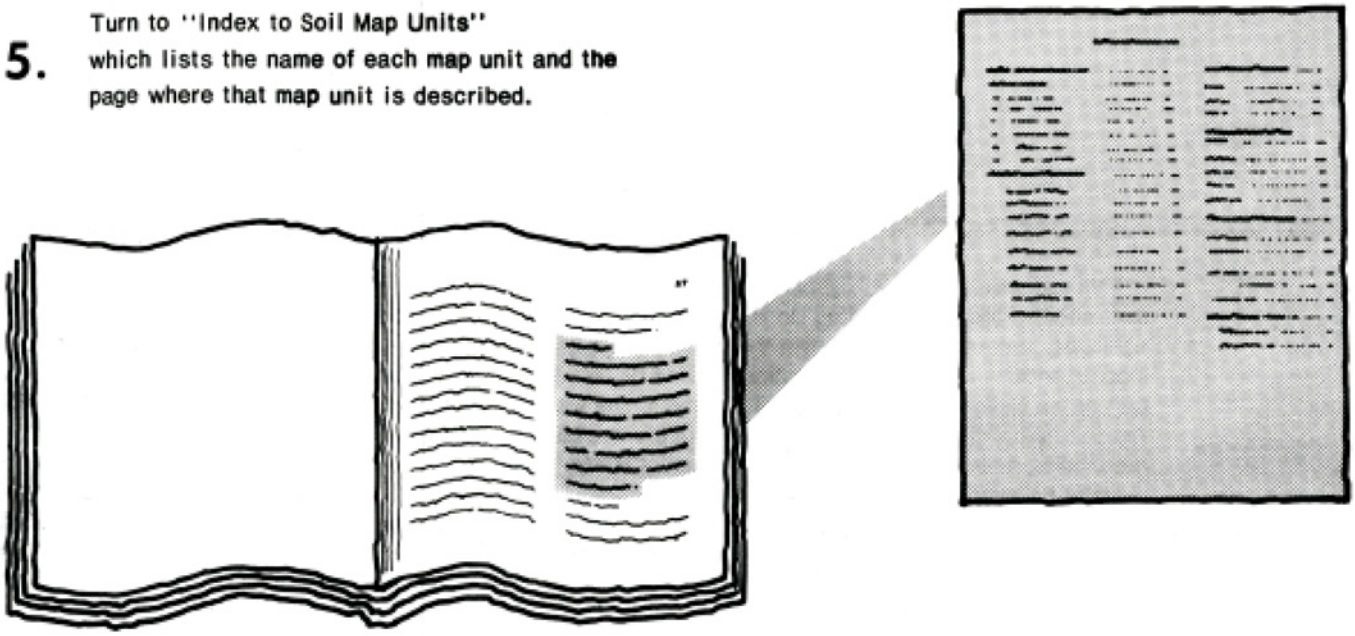
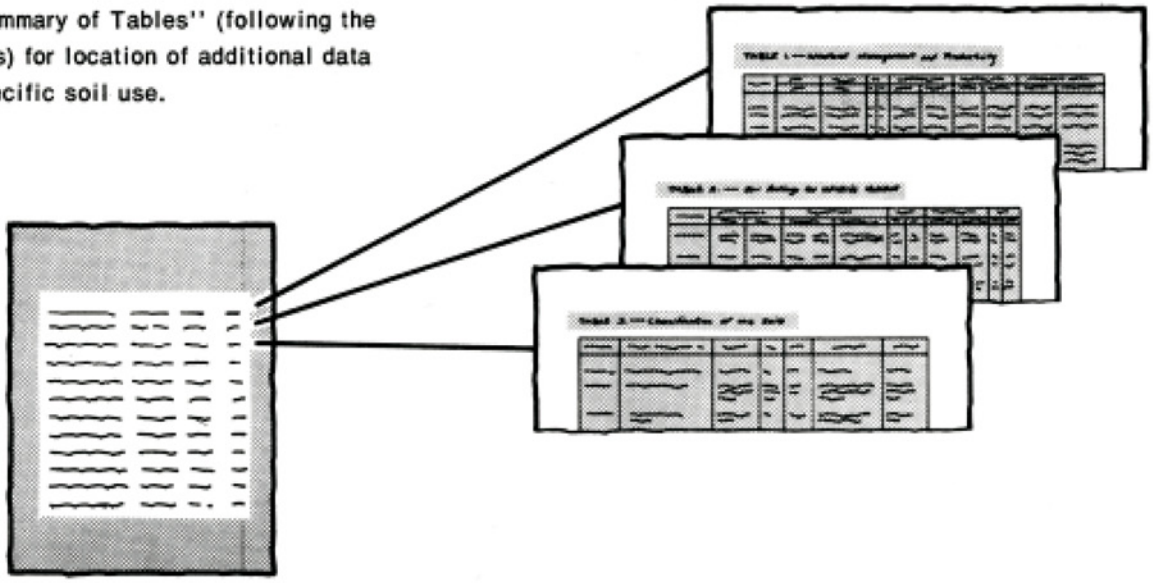
THIS SOIL SURVEY

5. Turn to "Index to Soil Map Units" which lists the name of each map unit and the page where that map unit is described.



6. See "Summary of Tables" (following the Contents) for location of additional data on a specific soil use.



7. Consult "Contents" for parts of the publication that will meet your specific needs. This survey contains useful information for farmers or ranchers, foresters or agronomists; for planners, community decision makers, engineers, developers, builders, or homebuyers; for conservationists, recreationists, teachers, or students; to specialists in wildlife management, waste disposal, or pollution control.

This soil survey is a publication of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other federal agencies, state agencies including the Agricultural Experiment Stations, and local agencies. The Soil Conservation Service has leadership for the federal part of the National Cooperative Soil Survey. In line with Department of Agriculture policies, benefits of this program are available to all, regardless of race, color, national origin, sex, religion, marital status, or age.

Major fieldwork for this soil survey was performed in the period 1976-1979. Soil names and descriptions were approved in 1980. Unless otherwise indicated, statements in this publication refer to conditions in the survey area in 1979. This survey was made cooperatively by the Soil Conservation Service, the Forest Service, and the Arkansas Agricultural Experiment Station. It is part of the technical assistance furnished to the Perry County Conservation District.

Soil maps in this survey may be copied without permission. Enlargement of these maps, however, could cause misunderstanding of the detail of mapping. If enlarged, maps do not show the small areas of contrasting soils that could have been shown at a larger scale.

Cover: The soils in Perry County are mainly used for forests, pasture, and row crops. The pasture and cropland are mainly on Gallion silt loam and Roxana very fine sandy loam. The forest in the background is on Carnasaw-Pirum-Clebit association, steep.

contents

soil series

Issued May 1982

index to map units

summary of tables

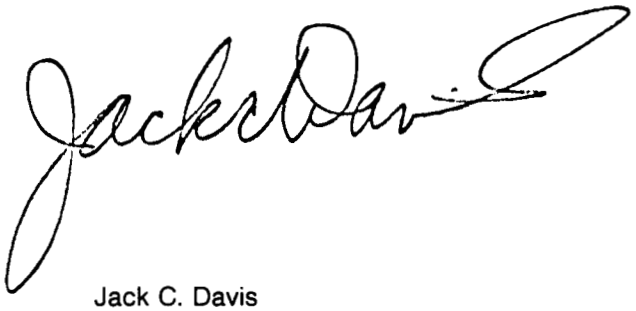
foreword

This soil survey contains information that can be used in land-planning programs in Perry County. It contains predictions of soil behavior for selected land uses. The survey also highlights limitations and hazards inherent in the soil, improvements needed to overcome the limitations, and the impact of selected land uses on the environment.

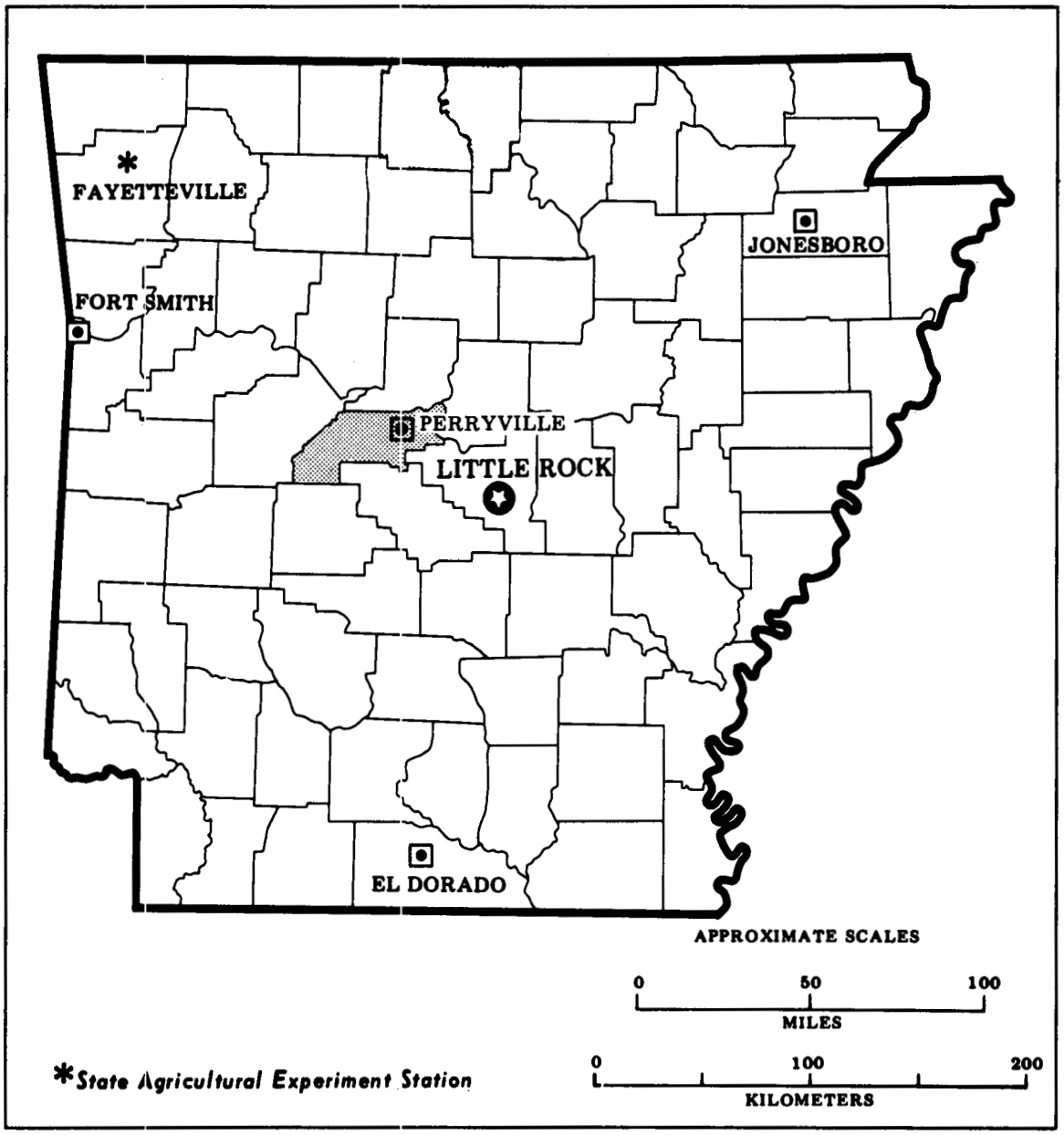
This soil survey is designed for many different users. Farmers, ranchers, foresters, and agronomists can use it to evaluate the potential of the soil and the management needed for maximum food and fiber production. Planners, community officials, engineers, developers, builders, and home buyers can use the survey to plan land use, select sites for construction, and identify special practices needed to insure proper performance. Conservationists, teachers, students, and specialists in recreation, wildlife management, waste disposal, and pollution control can use the survey to help them understand, protect, and enhance the environment.

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are shallow to bedrock. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

These and many other soil properties that affect land use are described in this soil survey. Broad areas of soils are shown on the general soil map. The location of each soil is shown on the detailed soil maps. Each soil in the survey area is described. Information on specific uses is given for each soil. Help in using this publication and additional information are available at the local office of the Soil Conservation Service or the Cooperative Extension Service.



Jack C. Davis
State Conservationist
Soil Conservation Service



Location of Perry County in Arkansas.

soil survey of
Perry County, Arkansas

By William R. Townsend and Leodis Williams, Soil Conservation Service

United States Department of Agriculture
Soil Conservation Service and Forest Service
in cooperation with
Arkansas Agricultural Experiment Station

PERRY COUNTY is in the central part of Arkansas. The total area of the county is about 359,040 acres, or 561 square miles. The total land area is about 352,576 acres and includes 836 acres of water in bodies less than 40 acres and streams less than one-eighth of a mile in width.

The county is bounded on the east by Faulkner and Pulaski Counties; on the south by Pulaski, Saline, and Garland Counties; on the west by Yell County; and on the north by Conway County.

The topography of the county varies from level bottom land along the flood plain of the Arkansas River and the Fourche la Fave River to the steep Ouachita Mountains. The Arkansas River is located along the eastern border of the county, and the Fourche la Fave River is in the central part of the county.

In 1970, the population of the county was about 5,634. Perryville, the county seat, had a population of 1,000. Other communities in the county that have a population of less than 500 are Perry, Adona, Casa, Thornburg, Alpin, Bigelow, and Hollis. A large section of the county is owned by large paper companies (112,856 acres) and the U.S. Department of Agriculture, Forest Service and the U.S. Army, Corps of Engineers (97,135 acres).

The first soil survey of Perry County was published in 1920 (*3*). This survey is now out-of-print. This present survey updates the first survey and provides additional interpretive information, contains more detail, and has soil boundaries delineated on aerial photographs.

general nature of the county

This section discusses farming, physiography and drainage, and climate in Perry County.

farming

Perry County was first formed as a territory on December 18, 1840. It was originally a part of Conway County. The county was named for Commodore Oliver Hazard Perry, hero of the Battle of Lake Erie in the War of 1812. In 1841, Perryville was named the county seat. The first settlement in the county was along the Fourche la Fave River, about 9 miles from the present site of Perryville, in 1808.

Early settlers in Perry County farmed the soils that had good natural drainage and that were above the flood plain of the Arkansas River and its tributaries, mainly in the valleys on uplands. These settlers were subsistence farmers, but they soon started to grow cotton and corn as cash crops. Most of the better drained areas were cleared for cotton and corn. The steep, stony, or wet areas were left in woodland.

Farming has become more diversified. It is generally more intensive on bottom lands and less intensive on uplands. In the upland areas, beef cattle, forage crops, poultry, and hogs provide most of the farm income.

On the bottom lands of the Arkansas River, flood control, improved crop varieties, mechanization,

insecticides, and other technological advances have led to expansion of crops and pasture into most of the area. Most of the lowlands have been cleared, and on most farms drainage has been improved for more reliable crop production.

Soybeans is the main crop grown on the bottom lands, but rice, wheat, and sorghums are also grown. Most of the farmers also have herds of beef cattle.

In 1970, about one-third of the county was in farmland. The rest of the county is cities, other built up areas, and transportation facilities; areas being developed for non-farm uses, such as recreation or housing; state land within Petit Jean State Park; land owned by large timber companies; and federally administered land within the Ouachita National Forest.

physiography and drainage

The Fourche la Fave River runs through the county from west to east, with about half of the county south of the river. The Arkansas River is the eastern boundary of the county. Bottom land is located on broad flood plains and narrow strips along the rivers and their tributaries. Several old filled-in oxbow lakes on the flood plains are evidence that these rivers have meandered. In addition, there are several sloughs and bayous. Other drainageways are Cypress Creek, Bear Creek, Maumelle River, Mill Creek, Big Creek, Rocky Creek, Rose Creek, and the South Fourche la Fave River.

The flow of the Arkansas River is controlled by large flood-control impoundments in its upstream watershed. A series of lakes and dams form navigable pools, and the river is open year-round to barge traffic. This river provides recreation in the form of fishing, boating, and waterfowl hunting. It yields sand and gravel in quantities large enough to be profitably dredged. All of the streams in Perry County eventually drain into the Arkansas River.

The alluvial soils on lowlands are level to undulating, and some of these soils are subject to flooding. Gallion, Roxana, Perry, and Moreland soils formed on these bottom lands.

Undulating uplands formed along tributaries of the Arkansas River. This area of loamy unconsolidated sediment is level to gently sloping, and the dominant gradient is less than 5 percent. Leadvale, Muskogee, McKamie, and Allen soils are the main soils on the sloping parts. Barling, Guthrie, Taft, Spadra, and Wrightsville soils are on the flats. This area is drained by streams that flow out of the hilly uplands.

The topography of the hilly or mountainous part of the county is mainly gently sloping to very steep ridges, crests, and side slopes. This part of the county is in the Ouachita Mountains Major Land Resource Area. Elevation of this area ranges from 450 feet above sea level on the lower foot slopes to 1,812 feet above sea level on Deckard Mountain. The rocks are fractured and tilted at more than 30° to the horizontal. Intense folding and faulting were major factors in shaping the landscape in this area. With few exceptions, valleys in the area are quite narrow, as are the ridgetops and mountaintops. The principal streams that drain this area are the South and North Forks of Fourche la Fave River and Maumelle River in the southeastern corner of the county. Carnasaw, Pirum, Clebit, and Ceda soils are the main soils in this area.

The area north of Big Creek and Rocky Creek has bedrock tilted at less than 30° to nearly level bedded. This part of the county is in the Arkansas Valley and Ridges Major Land Resource Area. Linker, Enders, and Mountainburg soils are the main soils in this area.

Most of the tributary streams in the uplands are intermittent, but some flow year-round. Livestock water is obtained from the creeks and from wells and ponds. Domestic water supplies are mostly from wells, although in most places the ground water supply is insufficient for irrigation. Water for irrigation on the bottom lands is obtained from deep wells and from surface water impounded in reservoirs.

climate

Prepared by the National Climatic Center, Asheville, North Carolina.

Perry County is hot in summer, especially at low elevations, and moderately cool in winter, especially on mountains and high hills. Rainfall is fairly heavy and well distributed throughout the year. Snow falls nearly every winter, but snow cover lasts only a few days.

Table 1 gives data on temperature and precipitation for the survey area as recorded at Nimrod Dam, Arkansas in the period 1951 to 1978. Table 2 shows probable dates of the first freeze in fall and the last freeze in spring. Table 3 provides data on length of the growing season.

In winter the average temperature is 40° F, and the average daily minimum temperature is 28°. The lowest temperature on record, which occurred at Nimrod Dam on January 12, 1962, is -11°. In summer the average temperature is 79°, and the average daily maximum temperature is 91°. The highest recorded temperature, which occurred on July 14, 1954, is 111°.

Growing degree days are shown in table 1. They are equivalent to "heat units." During the month, growing degree days accumulate by the amount that the average temperature each day exceeds a base temperature (50° F). The normal monthly accumulation is used to schedule single or successive plantings of a crop between the last freeze in spring and the first freeze in fall.

Of the total annual precipitation, 24 inches, or 52 percent, usually falls in April through September, which includes the growing season for most crops. In 2 years out of 10, the rainfall in April through September is less than 19 inches. The heaviest 1-day rainfall during the period of record was 5.60 inches at Nimrod Dam on September 22, 1965. Thunderstorms occur on about 60 days each year, and most occur in summer.

Average seasonal snowfall is 3 inches. The greatest snow depth at any one time during the period of record was 8 inches. On an average of 1 day, at least 1 inch of snow is on the ground. The number of such days varies greatly from year to year.

The average relative humidity in midafternoon is about 60 percent. Humidity is higher at night, and the average at dawn is about 80 percent. The sun shines 70 percent of the time possible in summer and 50 percent in winter. The prevailing wind is from the southwest. Average windspeed is highest, 9 miles per hour, in spring.

how this survey was made

Soil scientists made this survey to learn what soils are in the survey area, where they are, and how they can be used. They observed the steepness, length, and shape of slopes; the size of streams and the general pattern of drainage; the kinds of native plants or crops; and the kinds of rock. They dug many holes to study soil profiles. A profile is the sequence of natural layers, or horizons, in a soil. It extends from the surface down into the parent material, which has been changed very little by leaching or by plant roots.

The soil scientists recorded the characteristics of the profiles they studied and compared those profiles with others in nearby counties and in more distant places. They classified and named the soils according to nationwide uniform procedures. They drew the boundaries of the soils on aerial photographs. These photographs show trees, buildings, fields, roads, and other details that help in drawing boundaries accurately. The soil maps at the back of this publication were prepared from aerial photographs.

The areas shown on a soil map are called map units. Most map units are made up of one kind of soil. Some are made up of two or more kinds. The map units in this survey area are described under "General soil map units" and "Detailed soil map units."

While a soil survey is in progress, samples of some soils are taken for laboratory measurements and for engineering tests. All soils are field tested to determine their characteristics. Interpretations of those characteristics may be modified during the survey. Data are assembled from other sources, such as test results, records, field experience, and state and local specialists. For example, data on crop yields under defined management are assembled from farm records and from field or plot experiments on the same kinds of soil.

But only part of a soil survey is done when the soils have been named, described, interpreted, and delineated on aerial photographs and when the laboratory data and other data have been assembled. The mass of detailed information then needs to be organized so that it can be used by farmers, rangeland and woodland managers, engineers, planners, developers and builders, home buyers, and others.

general soil map units

The general soil map at the back of this publication shows broad areas that have a distinctive pattern of soils, relief, and drainage. Each map unit on the general soil map is a unique natural landscape. Typically, a map unit consists of one or more major soils and some minor soils. It is named for the major soils. The soils making up one unit can occur in other units but in a different pattern.

The general soil map can be used to compare the suitability of large areas for general land uses. Areas of suitable soils can be identified on the map. Likewise, areas where the soils are not suitable can be identified.

Because of its small scale, the map is not suitable for planning the management of a farm or field or for selecting a site for a road or building or other structure. The soils in any one map unit differ from place to place in slope, depth, drainage, and other characteristics that affect management.

The soils in the survey area vary widely in their suitability for major land uses. Soil suitability ratings are based on the practices commonly used in the survey area to overcome soil limitations. These ratings reflect the ease of overcoming the limitations. They also reflect the problems that will persist even if such practices are used.

Each map unit is rated for *cultivated crops, pasture crops, woodland,* and *urban uses.* Cultivated crops are those grown extensively in the survey area. Pasture crops are those grown for livestock forage production. Woodland refers to areas of native or introduced trees. Urban uses include residential, commercial, and industrial developments.

soil descriptions

1 Enders-Linker

Well drained, gently sloping to steep, deep and moderately deep, loamy, gravelly, and stony soils; on uplands

This map unit is in the northwestern and north-central parts of the county. It consists of soils on low mountaintops, ridgetops, side slopes, and benches in the Arkansas Valley and Ridges. The soils formed in clayey and loamy residuum weathered from shale and sandstone. Natural drainageways are mainly fast-flowing, intermittent streams.

This unit makes up about 6 percent of the county. It is about 65 percent Enders soils, 15 percent Linker soils, and 20 percent soils of minor extent.

Enders soils are on crests and adjacent side slopes and are deep. The surface layer is dark brown gravelly fine sandy loam. The subsoil is yellowish red silty clay loam and silty clay.

Linker soils are on mountain plateaus, lower side slopes, and benches and are moderately deep. The surface layer is dark grayish brown fine sandy loam. The subsoil is red sandy clay loam.

Of minor extent are moderately well drained Barling, Cane, and Leadvale soils and well drained Mountainburg and Spadra soils.

This map unit mainly consists of mixed woodland areas and small areas of pasture. Medium runoff, a very severe hazard of erosion, and stones on the surface are the main limitations for plants on Enders soils. Depth to bedrock and a very severe hazard of erosion are the main limitations for plants on Linker soils.

The soils in this unit are poorly suited or unsuited to row crops. These soils are moderately suited or unsuited to pasture. Medium runoff, a very severe hazard of erosion, and stones on the surface are the main limitations on Enders soils. Depth to bedrock and a very severe hazard of erosion are the main limitations on Linker soils. Enders soils are moderately suited or poorly suited to woodland use because slope, stones on the surface, and the hazard of erosion are limitations. Linker soils have only slight limitations for woodland use and management.

The soils in this unit are poorly suited to most urban uses. Shrink-swell potential, slow permeability, and slope of the Enders soils are severe limitations for local roads and streets, dwellings, small commercial buildings, and septic tank absorption fields. Depth to rock and slope of the Linker soils are moderate limitations for local roads and streets, dwellings, and small commercial buildings. Depth to rock is a severe limitation for septic tank absorption fields.

2 Carnasaw-Pirum-Clebit

Well drained, gently sloping to very steep, deep, moderately deep, and shallow, loamy, gravelly, and stony soils; on uplands

This map unit is throughout the county, except in the extreme northwestern and north-central parts. It consists

of soils on the tops of hills and mountains, on the side slopes, on benches, and on low ridges in the valleys of the Ouachita Mountains. These soils formed where the bedrock is tilted and fractured shale, sandstone, or quartzite.

This unit makes up about 73 percent of the county. It is about 47 percent Carnasaw soils, 22 percent Pirum soils, 15 percent Clebit soils, and 16 percent soils of minor extent.

Carnasaw soils are on the crests and adjacent side slopes and are deep. The surface layer is dark brown stony silt loam and gravelly silt loam. The subsurface layer is strong brown loam. In sequence from the top, the subsoil is yellowish red silty clay loam and yellowish red silty clay.

Pirum soils are on colluvial positions and benches and are moderately deep or deep. The surface layer is dark brown fine sandy loam, gravelly fine sandy loam, or stony fine sandy loam. The subsoil is yellowish brown and strong brown sandy clay loam. The underlying material is yellowish red, fractured and tilted sandstone.

Clebit soils are on ridgecrests and side slopes and are shallow. The surface layer is very dark grayish brown stony fine sandy loam. The subsoil is strong brown very gravelly fine sandy loam. The underlying material is red and brown, fractured and tilted sandstone.

Of minor extent are soils similar to Pirum soils but that are less than 18 inches deep to bedrock, with a few spots of bedrock outcrop; loamy soils 20 to 40 inches deep to bedrock; soils similar to Carnasaw soils but that are more than 60 inches deep to bedrock; Barling, Cane, Ceda, Leadvale, Sherwood, and Spadra soils; and a few water areas.

Most areas of this unit are mainly used for timber production. Available water capacity, depth to bedrock, stones on the surface, and the severe hazard of erosion are the main limitations for plants.

The soils in this unit are poorly suited or unsuited to row crops and pasture. The clayey subsoil, hazard of erosion, and stones on the surface are the main limitations for Carnasaw soils. Depth to bedrock, the very severe hazard of erosion, and the stony surface layer are limitations for Clebit soils. Depth to bedrock and the hazard of erosion are the main limitations for Pirum soils. Carnasaw, Clebit, and Pirum soils are moderately suited or poorly suited to woodland use.

These soils are poorly suited to most urban uses. Shrink-swell potential, slow permeability, and slope of the Carnasaw soils are severe limitations for local roads and streets, dwellings, small commercial buildings, and septic tank absorption fields. Slope and depth to rock of the Pirum soils are moderate to severe limitations for local roads and streets, dwellings, small commercial buildings, and septic tank absorption fields. Depth of rock and slope of the Clebit soils are severe limitations for most urban uses.

3 Leadvale-Guthrie

Moderately well drained and poorly drained, level to gently sloping, deep, loamy soils; on local stream terraces and in depressions

This map unit is along the major drainageways throughout the county. The unit consists of soils on stream terraces and in depressions in the Arkansas Valley and Ridges. These soils formed in loamy material on uplands or in local loamy alluvium from nearby uplands underlain mainly by shale and siltstone. Natural drainageways are mainly slow-flowing intermittent streams.

This unit makes up about 13 percent of the county. It is about 36 percent Leadvale soils, 28 percent Guthrie soils, and 36 percent soils of minor extent.

Leadvale soils are on higher terraces and are moderately well drained. The surface layer is dark brown silt loam and yellowish brown, mottled silty clay loam. The subsoil is silty clay.

Guthrie soils are on lower terraces and in depressions and are poorly drained. The surface layer is grayish brown silt loam and gray silt loam. The subsoil is silty clay loam.

Of minor extent are the moderately well drained Barling and Cane soils; the well drained Ceda, Linker, and Spadra soils; and the somewhat poorly drained Taft soils.

The soils in this unit are mainly used for pasture and row crops, except for intermingled areas of woodland. The hazard of erosion and wetness are the main limitations for use and management of these soils.

These soils range from well suited to poorly suited to row crops. They are well suited or moderately suited to pasture. Farming operations are commonly delayed several days after rain because of excess water. Surface drains are needed. The soils in this unit are well suited to use as woodland. Harvesting timber is generally limited to the drier seasons for Guthrie soils. Leadvale soils have only slight limitations.

Leadvale soils are moderately suited to most urban uses. Wetness is a moderate limitation for dwellings, local roads and streets, and small commercial buildings. Guthrie soils are poorly suited to most urban uses. Wetness and flooding are severe limitations for dwellings, local roads and streets, and small commercial buildings. Wetness and moderately slow and slow permeability of Leadvale and Guthrie soils are severe limitations for septic tank absorption fields. The severity of these limitations can be lessened through drainage to lower the water table and through proper design of the absorption field.

4 Roxana-Gallion

Well drained, level to nearly level, deep, loamy soils; on flood plains and old natural levees

This map unit consists of level to nearly level soils along the Arkansas River in the eastern part of the

county. These soils formed in stratified loamy alluvium. Natural drainageways are mainly fast-flowing streams or rivers.

This unit makes up about 2 percent of the county. It is about 59 percent Roxana soils, 16 percent Gallion soils, and 25 percent soils of minor extent.

Roxana soils are on flood plains. The surface layer is reddish brown very fine sandy loam. The substratum is yellowish red, dark brown, brown, and strong brown very fine sandy loam.

Gallion soils are on high flood plains. The surface layer is dark brown silt loam. The subsoil is reddish brown and yellowish red silty clay loam and silt loam.

Of minor extent are the well drained Allen and McKamie soils, the somewhat poorly drained Moreland soils, and the poorly drained Perry soils.

The soils in this unit are mainly used for cultivated crops, except for small areas that are used for pasture and as woodland. A moderate hazard of erosion on the nearly level Roxana soils is the only limitation for the soils in this unit.

Roxana and Gallion soils are well suited to most crops commonly grown in the county. These soils are well suited to pasture and to use as woodland. There are no significant limitations for woodland use or management.

The soils in this unit are well suited or moderately suited to most urban uses. Roxana soils have no major limitations for dwellings, local roads and streets, and small commercial buildings. Shrink-swell potential of the Gallion soils is a moderate limitation for dwellings, local roads and streets, and small commercial buildings. Moderate permeability of Gallion soils is a moderate limitation for septic tank absorption fields. Wetness and moderate permeability of the Roxana soils are moderate limitations for septic tank absorption fields.

5 Perry-Moreland

Poorly drained and somewhat poorly drained, level, deep, clayey soils; on broad flood plains and low terraces

This map unit is in the eastern part of the county. It consists of areas on broad flats, backswamps, and in depressions on flood plains and low terraces in the Arkansas Valley and Ridges. The soils formed in clayey alluvium. Natural drainageways are mainly slow-flowing intermittent streams.

The unit makes up about 3 percent of the county. It is about 53 percent Perry soils, 28 percent Moreland soils, and 19 percent soils of minor extent.

Perry soils are on the lower part of flood plains and terraces and are poorly drained. The surface layer is dark grayish brown clay. The upper part of the subsoil is gray and dark gray clay, and the lower part is dark reddish brown and reddish brown clay.

Moreland soils are on the higher part of flood plains and terraces and are somewhat poorly drained. The surface layer is dark brown silty clay. The subsurface layer is dark reddish brown silty clay. The subsoil is dark reddish brown and reddish brown silty clay.

Of minor extent are the well drained Gallion soils and the poorly drained Guthrie and Wrightsville soils.

The soils in this unit are mainly used for cultivated crops, except for small areas that are used for pasture and as woodland. Wetness is the main limitation for this use, and flooding is a limitation for Perry soils.

The soils are well suited to short season row crops but are moderately suited to most crops grown in the county. These soils are well suited to pasture. Farming operations are commonly delayed several days after rain because of excess water. Surface drains are needed. Wetness is the main limitation for use and management of both soils. Flooding is also a limitation for crops on Perry soils. The soils are well suited to use as woodland. Wetness is the main limitation for equipment use in managing and harvesting the crop. This limitation is usually overcome, however, by logging during the drier seasons.

The soils in this unit are poorly suited to most urban uses. Wetness and shrink-swell potential are severe limitations for dwellings, local roads and streets, and small commercial buildings. Very slow or slow permeability and a seasonal high water table are severe limitations for septic tank absorption fields. Flooding is also a severe limitation for all urban uses on Perry soils. These limitations are difficult or impractical to overcome.

6 Muskogee-Wrightsville-McKamie

Moderately well drained, poorly drained, and well drained, level to gently sloping, deep, loamy soils; on terraces

This map unit is in the northern, central, and eastern parts of the county. It consists of level to gently sloping soils on side slopes, flats, or in depressions in the Arkansas Valley and Ridges. These soils formed in loamy and clayey sediments on stream terraces. Natural drainageways are mainly slow-flowing intermittent streams.

This unit makes up about 3 percent of the county. It is about 49 percent Muskogee soils, 20 percent Wrightsville soils, 19 percent McKamie soils, and 12 percent soils of minor extent.

Muskogee soils are on higher terraces and are moderately well drained. The surface layer is brown silt loam. The subsurface layer is yellowish brown, mottled silt loam. The subsoil is yellowish brown, mottled silty clay loam and mottled light brownish gray, yellowish red, and red silty clay and red clay.

Wrightsville soils are on lower terraces and are poorly drained. The surface layer is grayish brown silt loam. The subsurface layer is gray, mottled silt loam. The subsoil is gray and grayish brown, mottled silty clay loam and silty clay.

McKamie soils are on higher terraces and are well drained. The surface layer is dark brown silt loam. The

subsurface layer is brown silt loam. The subsoil is red clay and silty clay. The substratum is yellowish red very fine sandy loam, silt loam, and silty clay loam.

Of minor extent are well drained Allen soils and moderately well drained Leadvale and Cane soils.

The soils in this unit are mainly used for pasture crops, except for small areas that are used as woodland. The main limitations for McKamie and Muskogee soils are the tight clay subsoil and hazard of erosion. Wetness is a limitation for the Wrightsville soils.

In this unit the soils range from well suited to poorly suited to row crops. These soils are well suited or moderately suited to pasture. The main limitations for McKamie and Muskogee soils are the tight clay subsoil and hazard of erosion. Wetness is the main limitation for Wrightsville soils. This unit is well suited to use as woodland. Harvesting timber is usually limited to the drier seasons for Wrightsville soils.

The soils in this unit are poorly suited to residential and urban uses. Slow permeability and high shrink-swell potential are severe limitations for most urban uses. Wetness is also a severe limitation for Wrightsville and Muskogee soils. Slow and very slow permeability is a severe limitation for septic tank absorption fields. These limitations are difficult or impractical to overcome.

broad land use considerations

Deciding which land should be used for urban development is an important issue in the survey area. Each year land is being developed for urban uses in Perryville, Bigelow, and other areas in the county. It is estimated that about 1,200 acres is urban or built-up land. The general soil map is helpful for planning the general outline of urban areas. It cannot be used for the selection of sites for specific urban structures. Generally, soils that are well suited to cultivated crops are also well suited to urban development. The data about specific soils in this survey can be helpful in planning future land use patterns.

Areas in which the soils are so unfavorable that urban development is prohibitive are extensive in this county. Shrink-swell potential, slope, and depth to rock are severe limitations in the Enders-Linker and Carnasaw-Pirum-Clebit map units. Wetness, slow permeability, shrink-swell potential, and a seasonal high water table are severe limitations in the Perry-Moreland and Muskogee-Wrightsville-McKamie map units. Occasionally flooding is a severe limitation in small areas of the Roxana-Gallion map unit that are not protected by natural levees.

Some soils are moderately suited to urban development, such as areas of the Roxana-Gallion map unit that are protected by natural levees. These soils are also well suited to use as farmland. This fact should be considered when making broad land use plans.

Some areas of the Leadvale-Guthrie unit are moderately suited to urban development. Wetness, low strength, and slow permeability are the main limitations for these soils. With proper engineering design, these limitations can usually be overcome. It should be noted, however, that the soils are moderately suited to farming, and many farmers have provided sufficient drainage for crop production.

Vegetables and other specialty crops are uniquely suited to areas of the Roxana-Gallion unit. The Leadvale-Guthrie unit is well suited to pasture and hay crops. The well drained soils in the Roxana-Gallion unit warm up early in spring. Nurseries are also well suited to these soils.

Soils in Perry County are mainly moderately suited or well suited to use as woodland. Areas of the Enders-Linker, Carnasaw-Pirum-Clebit, and Leadvale-Guthrie map units are mainly moderately suited to the production of pine and upland hardwoods. Most areas of the Roxana-Gallion, Perry-Moreland, and Muskogee-Wrightsville-McKamie map units are well suited to the production of bottom land hardwoods.

detailed soil map units

The map units on the detailed soil maps at the back of this survey represent the soils in the survey area. The map unit descriptions in this section, along with the soil maps, can be used to determine the suitability and potential of a soil for specific uses. They also can be used to plan the management needed for those uses. More information on each map unit, or soil, is given under "Use and management of the soils."

Each map unit on the detailed soil maps represents an area on the landscape and consists of one or more soils for which the unit is named.

A symbol identifying the soil precedes the map unit name in the soil descriptions. Each description includes general facts about the soil and gives the principal hazards and limitations to be considered in planning for specific uses.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer or of the underlying material, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer or of the underlying material. They also can differ in slope, stoniness, salinity, wetness, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Linker fine sandy loam, 3 to 8 percent slopes, is one of several phases in the Linker series.

Some map units are made up of two or more major soils. These map units are called soil complexes, soil associations, or undifferentiated groups.

A *soil complex* consists of two or more soils in such an intricate pattern or in such small areas that they cannot be shown separately on the soil maps. The pattern and proportion of the soils are somewhat similar in all areas. Mountainburg-Rock outcrop complex, 3 to 20 percent slopes, is an example.

A *soil association* is made up of two or more geographically associated soils that are shown as one unit on the maps. Because of present or anticipated soil uses in the survey area, it was not considered practical or necessary to map the soils separately. The pattern and relative proportion of the soils are somewhat similar. Carnasaw-Pirum association, undulating, is an example.

An *undifferentiated group* is made up of two or more soils that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils in a mapped area are not uniform. An area can be made up of only one of the major soils, or it can be made up of all of them. There are no undifferentiated groups in this survey area.

Most map units include small scattered areas of soils other than those for which the map unit is named. Some of these included soils have properties that differ substantially from those of the major soil or soils. Such differences could significantly affect use and management of the soils in the map unit. The included soils are identified in each map unit description. Some small areas of strongly contrasting soils are identified by a special symbol on the soil maps.

This survey includes *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example. Miscellaneous areas are shown on the soil maps. Some that are too small to be shown are identified by a special symbol on the soil maps.

Table 4 gives the acreage and proportionate extent of each map unit. Other tables (see "Summary of tables") give properties of the soils and the limitations, capabilities, and potentials for many uses. The Glossary defines many of the terms used in describing the soils.

soil descriptions

1—Allen loam, 3 to 8 percent slopes. This deep, well drained, moderately permeable soil is on gently sloping terraces. Areas range from 20 to 500 acres.

Typically, the surface layer is dark yellowish brown loam about 5 inches thick. The subsoil is yellowish red loam to a depth of 12 inches; yellowish red sandy clay loam to a depth of 20 inches; yellowish red, mottled sandy clay loam to a depth of 36 inches; and red, mottled sandy clay loam to a depth of 72 inches.

This soil is moderate or low in natural fertility and low in organic matter content. Permeability is moderate, available water capacity is medium, and the hazard of erosion is severe. Reaction is strongly acid or very strongly acid throughout.

Included with this soil in mapping are a few small areas of McKamie and Muskogee soils and soils that are

similar to Allen soils but that have a loamy fine sand substratum.

The Allen soil is moderately suited to most crops commonly grown in the county. A severe hazard of erosion is the main limitation to use and management. Adapted crops are soybeans and small grains, but most of the acreage is used as woodland. This soil is well suited to pasture. Adapted pasture plants are bermudagrass, tall fescue, white clover, sericea lespedeza, and annual lespedeza. Crops respond well to fertilization, and tilth is easy to maintain.

This soil is well suited to use as woodland. Adapted species are shortleaf pine, black walnut, and loblolly pine. There are no significant limitations for woodland use or management.

This Allen soil is moderately suited to most urban uses. Slope is a moderate limitation for small commercial buildings. Low strength is a moderate limitation for local roads and streets. There are no major limitations for dwellings. Moderate permeability is a moderate limitation for septic tank absorption fields. These limitations can usually be overcome by proper design.

This soil is in capability unit IIIe-1 and woodland suitability group 3o7.

2—Barling silt loam, occasionally flooded. This deep, level, moderately well drained soil is on flood plains along tributaries of the Arkansas River. Slopes are 0 to 1 percent. The soil is flooded for brief periods during the period December to April, but flooding occurs no more than once every 2 years. Areas range from about 40 to 80 acres.

Typically, the surface layer is dark grayish brown silt loam about 4 inches thick. The subsurface layer is brown silt loam to a depth of 8 inches. The subsoil is dark yellowish brown, mottled silt loam to a depth of 39 inches; yellowish brown, mottled silt loam to a depth of 50 inches; and dark yellowish brown, mottled silt loam to a depth of 75 inches.

This soil is moderate in natural fertility and organic matter content. Reaction ranges from slightly acid to strongly acid in the surface layer and upper part of the subsoil, and it ranges from slightly acid to very strongly acid in the middle and lower parts of the subsoil. Permeability is moderate. The water table is perched at a depth of 1 foot to 4 feet from December to April. Available water capacity is high.

Included with these soils in mapping are a few small areas of Leadvale, Taft, and Spadra soils. Also included are small low areas that are flooded for short periods, occurring more often than once every two years.

The Barling soil is well suited to the cultivated crops commonly grown in the county, but nearly all of the acreage is pasture. The principal cultivated crop is soybeans. Among the other adapted crops are cotton and small grain. This soil is well suited to pasture. Adapted pasture plants are bermudagrass, tall fescue, sericea lespedeza, white clover, and annual lespedeza. Excess water and occasional flooding sometimes delay farming operations for several days after heavy rains. Crops respond well to fertilization, and tilth is easy to maintain.

This soil is well suited to use as woodland. Adapted species are eastern cottonwood, American sycamore, shortleaf pine, loblolly pine, sweetgum, and cherrybark oak. There are only slight limitations for woodland use and management.

This Barling soil is poorly suited to most urban uses. Occasional flooding is a severe limitation for dwellings, local roads and streets, and small commercial buildings. Occasional flooding and wetness are severe limitations for septic tank absorption fields. These limitations can be overcome only by major flood control and drainage measures.

This soil is in capability unit IIw-1 and woodland suitability group 2o7.

3—Cane fine sandy loam, 3 to 8 percent slopes. This deep, moderately well drained, gently sloping soil is on convex hills and toe slopes. Areas range from 40 to 150 acres.

Typically, the surface layer is yellowish brown fine sandy loam about 10 inches thick. The subsoil is yellowish red silty clay loam to a depth of 29 inches; compact and brittle, red, mottled silty clay loam to a depth of 67 inches; and mottled red, light brownish gray, and reddish yellow silty clay loam to a depth of 94 inches.

This soil is low in natural fertility and organic matter content. Reaction is strongly acid or very strongly acid throughout. The hazard of erosion is severe. Permeability is moderate above the fragipan and slow in the fragipan. Available water capacity is medium. The water table ranges from a depth of 24 to 36 inches below the surface during winter and early in spring.

Included with this soil in mapping are a few small areas of Leadvale soils. Also included are soils that are darker in the upper part of the subsoil and that have slopes of less than 3 percent.

This Cane soil is moderately suited to most crops commonly grown in the county. Pasture is the principal crop. Among the other adapted crops are corn, soybeans, and wheat. This soil is well suited to pasture. Adapted pasture plants are bahiagrass, common bermudagrass, tall fescue, white clover, sericea lespedeza, and annual lespedeza. The firm, brittle layer in the subsoil restricts root penetration and slows the movement of water through the soil. A severe hazard of erosion is the main limitation for use and management. Crops respond well to fertilization, and tilth is easy to maintain.

This soil is well suited to use as woodland. Adapted species are loblolly pine, shortleaf pine, and sweetgum. There are no major limitations to woodland use or management.

The Cane soil is moderately suited to most urban uses. Wetness is a moderate limitation for dwellings,

small commercial buildings, and local roads and streets. Slope is also a moderate limitation for small commercial buildings. Moderately slow permeability and wetness are severe limitations for septic tank absorption fields. The severity of these limitations can be lessened through drainage to lower the water table and through proper design of the absorption field.

This soil is in capability unit IIIe-2 and woodland suitability group 3o7.

4—Carnasaw gravelly silt loam, 3 to 8 percent slopes. This gently sloping, deep, well drained, slowly permeable soil is on ridgetops and side slopes and on the uplands of the Ouachita Mountains. Areas range from 20 to 140 acres.

Typically, the surface layer is dark brown gravelly silt loam about 4 inches thick. The subsurface layer is strong brown loam to a depth of 14 inches. The subsoil is yellowish red silty clay loam to a depth of 28 inches and yellowish red silty clay to a depth of 48 inches. Below that is shale laminated with sandstone.

This soil is low in natural fertility and organic matter content. Reaction of the surface layer is medium acid or strongly acid, and the subsoil is strongly acid or very strongly acid. Permeability is slow, and available water capacity is medium. Runoff is medium, and the hazard of erosion is very severe.

Included with this soil in mapping are a few small areas of Cane, Ceda, Leadvale, Pirum, and Sherwood soils.

This Carnasaw soil is poorly suited to row crops. Nearly all of the acreage is pasture. This soil is moderately suited to pasture. The principal plant is common bermudagrass. Other adapted pasture plants are bahiagrass, tall fescue, white clover, sericea lespedeza, and annual lespedeza. Winter small grain crops can be grown. Major limitations are the clayey subsoil, medium available water capacity, and very severe hazard of erosion. Crops respond well to fertilization, and tilth is easy to maintain.

This soil is moderately suited to use as woodland. Adapted species are loblolly pine and shortleaf pine. There are no significant limitations to woodland use or management.

The Carnasaw soil is poorly suited to most urban uses. Low strength and the shrink-swell potential are severe limitations for local roads and streets. Shrink-swell potential is a severe limitation for dwellings and small commercial buildings. Slow permeability is a severe limitation for septic tank absorption fields. These limitations are difficult to overcome.

This soil is in capability unit IVe-1 and woodland suitability group 4o1.

5—Carnasaw-Pirum association, undulating. This association consists of well drained, deep to moderately deep soils that are in a regular and repeating pattern. The soils are in areas large enough to be mapped separately, but they are not separated because of poor accessibility and low intensity of use. The Carnasaw soils are on side slopes of hills and mountains, and the Pirum soils are on middle and lower side slopes and benches. Slopes range from 3 to 8 percent. These soils developed in colluvium and residuum weathered from sandstone and shale. Mapped areas range from 30 to 400 acres.

Carnasaw soils are deep and make up about 50 percent of this association. In a typical profile of Carnasaw soils, the surface layer is dark brown gravelly silt loam about 4 inches thick. The subsurface layer is strong brown loam to a depth of 14 inches. The subsoil is yellowish red silty clay loam to a depth of 28 inches and yellowish red silty clay to a depth of 48 inches. Below that is shale laminated with sandstone.

Carnasaw soils have slow permeability and medium available water capacity. Natural fertility and organic matter content are low. Reaction of the surface layer is medium acid or strongly acid, and the subsoil is strongly acid or very strongly acid. The hazard of erosion is very severe.

Pirum soils are moderately deep or deep and make up about 35 percent of this association. In a typical profile of Pirum soils, the surface layer is dark brown fine sandy loam about 6 inches thick. The subsurface layer is yellowish brown fine sandy loam to a depth of 13 inches. The subsoil is yellowish brown sandy clay loam to a depth of 26 inches and strong brown sandy clay loam to a depth of 36 inches. Below that is yellowish red, fractured and tilted sandstone bedrock to a depth of 42 inches or more.

Pirum soils have moderate permeability and low available water capacity. Natural fertility and organic matter content are low. Reaction is strongly acid or very strongly acid throughout. The hazard of erosion is severe.

The remaining 15 percent of this association consists of Ceda, Clebit, and Sherwood soils.

Most areas of this association are mainly used for timber production. Smaller areas are sometimes used for pasture. These soils are poorly suited to row crops. They are moderately suited to pasture. The very severe hazard of erosion of the Carnasaw soils and the severe hazard of erosion of the Pirum soils are the main limitations.

Carnasaw soils are moderately suited and Pirum soils are well suited to use as woodland. There are no significant limitations for woodland use or management. Adapted species on Carnasaw soils are shortleaf pine and loblolly pine. Adapted species on Pirum soils are shortleaf pine, loblolly pine, southern red oak, and white oak. There are no significant limitations for woodland use or management.

Shrink-swell potential of the Carnasaw soils is a severe limitation for dwellings, local roads and streets, and small commercial buildings. Low strength is also a severe limitation for local roads and streets on Carnasaw soils. Slow permeability is a severe limitation for septic

tank absorption fields. Depth to rock in Pirum soils is a moderate limitation for dwellings, local roads and streets, and small commercial buildings and a severe limitation for septic tank absorption fields. Slope of Pirum soils is a moderate limitation for small commercial buildings.

Carnasaw soils are in capability unit IVe-1 and woodland suitability group 4o1. Pirum soils are in capability unit IIIe-3 and woodland suitability group 3o7.

6—Carnasaw-Pirum-Clebit association, rolling. This association consists of well drained, deep to shallow soils that are in a regular and repeating pattern. The soils are in areas large enough to be mapped separately, but they are not separated because of poor accessibility and low intensity of use. Carnasaw soils are on side slopes of hills and mountains, Pirum soils are on middle and lower side slopes and benches, and the shallow Clebit soils are on ridgetops or upper convex side slopes. Slopes range from 8 to 20 percent. These soils developed in residuum weathered from sandstone and shale. Mapped areas range from 30 to 1,000 acres.

Carnasaw soils are deep and make up about 55 percent of this association. In a typical profile of Carnasaw soils, the surface layer is dark brown stony silt loam about 4 inches thick. The subsurface layer is strong brown loam to a depth of 11 inches. The subsoil is yellowish red silty clay loam to a depth of 27 inches and yellowish red silty clay to a depth of 48 inches. Below that is shale laminated with sandstone.

Carnasaw soils have slow permeability and medium available water capacity. Natural fertility and organic matter content are low. Reaction of the surface layer is medium acid or strongly acid, and the subsoil is strongly acid or very strongly acid.

Pirum soils are moderately deep or deep and make up about 25 percent of this association. In a typical profile of Pirum soils, the surface layer is dark brown gravelly fine sandy loam about 5 inches thick. The subsurface layer is yellowish brown gravelly fine sandy loam to a depth of 12 inches. The subsoil is yellowish brown loam to a depth of 26 inches and strong brown sandy clay loam to a depth of 34 inches. Below that is yellowish red, fractured and tilted sandstone bedrock to a depth of 42 inches or more.

Pirum soils have moderate permeability and low available water capacity. Natural fertility and organic matter content are low. Reaction is strongly acid or very strongly acid throughout.

Clebit soils are shallow and make up about 15 percent of this association. In a typical profile of Clebit soils, the surface layer is very dark grayish brown stony fine sandy loam about 5 inches thick. The subsoil is strong brown very gravelly fine sandy loam to a depth of 14 inches. Below that is red and brown, fractured and tilted sandstone bedrock.

Clebit soils have moderately rapid permeability and very low available water capacity. Natural fertility and organic matter content are low. Reaction ranges from slightly acid to strongly acid.

The remaining 5 percent of this association consists of Ceda and Sherwood soils.

Most areas of this association are mainly used for timber production. Small areas are sometimes used for pasture. The soils in this unit are unsuited to row crops and pasture because of stones on the surface, depth to rock, slope, and a very severe hazard of erosion.

Carnasaw soils are moderately suited to use as woodland. Adapted species are loblolly pine and shortleaf pine. The hazard of erosion and equipment limitation are moderate. Pirum soils are well suited to use as woodland. Adapted species are loblolly pine, shortleaf pine, southern red oak, and white oak. The hazard of erosion and equipment limitation are moderate. Clebit soils are poorly suited to use as woodland. Adapted species are loblolly pine and shortleaf pine. The hazard of erosion, equipment limitation, and seedling mortality are moderate.

The soils in this association are poorly suited to urban uses. Shrink-swell potential and slope are severe limitations for small commercial buildings. Shrink-swell potential of Carnasaw soils is a severe limitation for dwellings and local roads and streets. Low strength is also a severe limitation for local roads and streets. Slow permeability in Carnasaw soils is a severe limitation for septic tank absorption fields. Slope and depth to rock are moderate limitations for dwellings on Pirum soils. Slope is a severe limitation for small commercial buildings. Depth to rock and slope are moderate limitations for local roads and streets. Depth to rock in Pirum soils is a severe limitation for septic tank absorption fields. Depth to rock in Clebit soils is a severe limitation for dwellings, small commercial buildings, local roads and streets, and septic tank absorption fields. Slope is also a severe limitation for small commercial buildings. These limitations are difficult to overcome.

Carnasaw soils are in capability unit VIIs-1 and woodland suitability group 4x2. Pirum soils are in capability unit VIe-1 and woodland suitability group 3r8. Clebit soils are in capability unit VIIs-2 and woodland suitability group 5x2.

7—Carnasaw-Pirum-Clebit association, steep. This association consists of well drained, deep to shallow soils that are in a regular and repeating pattern. The soils are in areas large enough to be mapped separately, but they are not separated because of poor accessibility and low intensity of use. The Carnasaw soils are on side slopes of hills and mountains, Pirum soils are on lower side slopes and benches, and the shallow Clebit soils are on ridgetops or upper convex side slopes. Slopes range from 20 to 40 percent. These soils developed in residuum weathered from sandstone and shale. Mapped areas range from 40 to 1,000 acres.

Carnasaw soils are deep and make up about 50 percent of this association. In a typical profile of Carnasaw soils, the surface layer is dark brown stony silt loam about 4 inches thick. The subsurface layer is strong

brown loam to a depth of 11 inches. The subsoil is yellowish red silty clay loam to a depth of 27 inches and yellowish red silty clay to a depth of 48 inches. Below that is shale laminated with sandstone.

Carnasaw soils have slow permeability and medium available water capacity. Natural fertility and organic matter content are low. Reaction of the surface layer is medium acid or strongly acid, and the subsoil is strongly acid or very strongly acid.

Pirum soils are moderately deep or deep and make up about 25 percent of this association. In a typical profile of Pirum soils, the surface layer is dark brown stony fine sandy loam about 4 inches thick. The subsurface layer is yellowish brown stony fine sandy loam to a depth of 10 inches. The subsoil is yellowish brown loam to a depth of 26 inches and strong brown sandy clay loam to a depth of 32 inches. Below that is yellowish red, fractured and tilted sandstone bedrock to a depth of 42 inches or more.

Pirum soils have moderate permeability and low available water capacity. Natural fertility and organic matter content are low. Reaction is strongly acid or very strongly acid throughout.

Clebit soils are shallow and make up about 20 percent of this association. In a typical profile of Clebit soils, the surface layer is very dark grayish brown stony fine sandy loam about 5 inches thick. The subsoil is strong brown very gravelly fine sandy loam to a depth of 14 inches. Below that is red and brown, fractured and tilted sandstone bedrock.

Clebit soils have moderately rapid permeability and very low available water capacity. Natural fertility and organic matter content are low. Reaction ranges from slightly acid to strongly acid.

The soils in this association are unsuited to crops and pasture because of stones on the surface, depth to rock, slope, and a very severe hazard of erosion (fig. 1). Most areas of this association are mainly used for timber production.

Figure 1.—The Carnasaw-Pirum-Clebit association, steep, is unsuited to most uses because of slope, stones on the surface, depth to rock, and the very severe hazard of erosion.

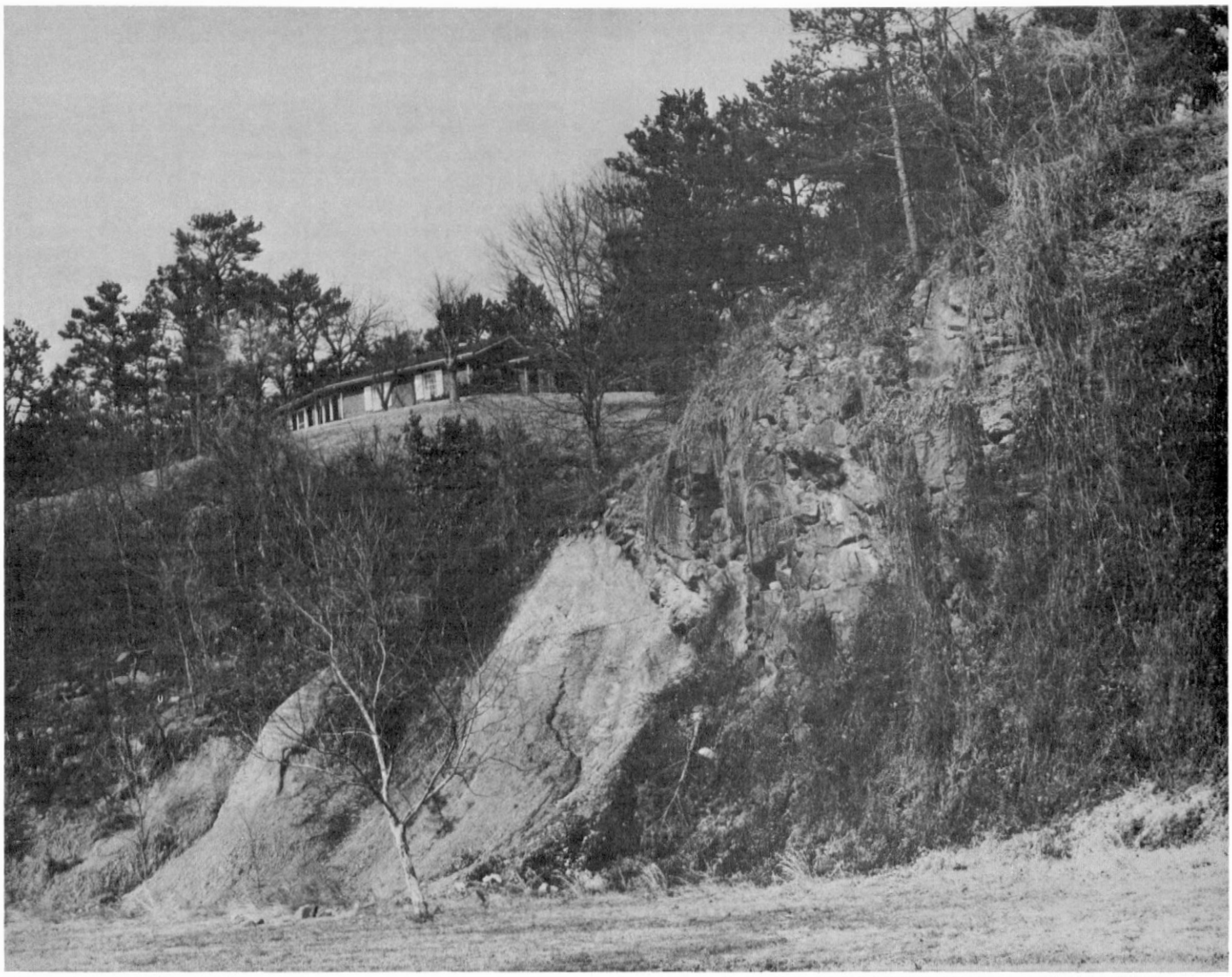


Figure 2.—Homes are being built on steep, stony soils, such as those in the Carnasaw-Pirum-Clebit association, steep. These soils are poorly suited to dwellings.

Carnasaw and Clebit soils are poorly suited to use as woodland. Adapted species are loblolly pine and shortleaf pine. The hazard of erosion and equipment limitation are severe. Pirum soils are moderately suited to use as woodland. Adapted species include shortleaf pine, loblolly pine, southern red oak, and white oak. The hazard of erosion and equipment limitation are severe.

The soils in this association are poorly suited to urban uses. Shrink-swell potential and slope of Carnasaw soils are severe limitations for dwellings, small commercial buildings, and local roads and streets (fig. 2). Low strength is also a severe limitation for local roads and streets. Slow permeability and slope of Carnasaw soils are severe limitations for septic tank absorption fields. Slope of Pirum soils is a severe limitation for dwellings, small commercial buildings, and local roads and streets. Depth to rock and slope of Pirum soils are severe limitations for septic tank absorption fields. Depth to rock and slope of Clebit soils are severe limitations for dwellings, small commercial buildings, local roads and streets, and septic tank absorption fields. These limitations are difficult to overcome.

Carnasaw soils are in capability unit VIIs-1 and woodland suitability group 5x3. Pirum soils are in

Figure 3.—Stones and flooding are limitations for woodland use or wildlife habitat on Ceda gravelly loam, frequently flooded. These limitations also make this soil unsuited to cultivated crops or pasture.

capability unit VIIs-1 and woodland suitability group 4x9. Clebit soils are in capability unit VIIs-2 and woodland suitability group 5x3.

8—Ceda gravelly loam, frequently flooded. This deep, well drained, nearly level soil is on narrow flood plains of streams. The soil is flooded for very brief periods during January through June. Slopes range from 0 to 3 percent. Areas range from 20 to 60 acres.

Typically, the surface layer is brown gravelly loam about 6 inches thick. The underlying material is brown very gravelly loam to a depth of 72 inches.

This soil is low in natural fertility and organic matter content. Reaction is slightly acid or medium acid throughout. Permeability is rapid, and available water capacity is low.

Included with these soils in mapping are small areas of Carnasaw, Leadvale, and Pirum soils.

This Ceda soil is unsuited to row crops and pasture. Nearly all of the acreage is used as woodland. The major limitations are the hazard of flooding and coarse fragments. This soil is well suited to use as woodland (fig. 3). Adapted species are shortleaf pine, oak, and sweetgum. Seedling mortality is a moderate limitation to woodland use and management.

The Ceda soil is poorly suited to most urban uses. Flooding is a severe limitation for septic tank absorption fields, local roads and streets, dwellings, and small commercial buildings. Poor filtering capacity is also a severe limitation for septic tank absorption fields. These limitations are very difficult or impractical to overcome.

This soil is in capability unit VIIs-3 and woodland suitability group 3f8.

9—Clebit-Carnasaw-Pirum association, very steep. This association consists of well drained, shallow to deep soils that are in a regular and repeating pattern. The soils are in areas large enough to be mapped separately, but they are not separated because of poor accessibility and low intensity of use. The shallow Clebit soils are on ridgetops and upper convex side slopes, the Carnasaw soils are on side slopes of hills and mountains, and Pirum soils are on lower side slopes and benches. Slopes range from 40 to 60 percent. These soils developed in residuum weathered from sandstone and shale. Mapped areas of this association range from 30 to 1,000 acres.

The shallow Clebit soils make up about 55 percent of this association. In a typical profile, the surface layer is very dark grayish brown stony fine sandy loam about 5 inches thick. The subsoil is strong brown very gravelly fine sandy loam to a depth of 14 inches. Below that is red and brown, fractured and tilted sandstone bedrock.

Clebit soils have moderately rapid permeability and very low available water capacity. Natural fertility and organic matter content are low. Reaction ranges from slightly acid to strongly acid.

The deep Carnasaw soils make up about 25 percent of this association. In a typical profile, the surface layer is dark brown stony silt loam about 4 inches thick. The subsurface layer is strong brown stony loam to a depth of 11 inches. The subsoil is yellowish red silty clay loam to a depth of 27 inches and yellowish red silty clay to a depth of 48 inches. Below that is shale laminated with sandstone.

Carnasaw soils have slow permeability and medium available water capacity. Natural fertility and organic matter content are low. Reaction of the surface layer is medium acid or strongly acid, and the subsoil is strongly acid or very strongly acid.

The moderately deep or deep Pirum soils make up about 10 percent of this association. In a typical profile, the surface layer is dark brown stony fine sandy loam about 4 inches thick. The subsurface layer is yellowish brown stony fine sandy loam to a depth of 10 inches. The subsoil is yellowish brown loam to a depth of 26 inches and strong brown sandy clay loam to a depth of 32 inches. Below that is yellowish red, fractured and tilted sandstone bedrock to a depth of 42 inches or more.

Pirum soils have moderate permeability and low available water capacity. Natural fertility and organic matter content are low. This soil is strongly acid or very strongly acid except for surfaces that have been limed.

The remaining 10 percent of this association consists of Sherwood soils and rock outcrops.

The soils in this association are unsuited to pasture and row crops. Most areas of this association are mainly used for timber production (fig. 4). Slope, a very severe hazard of erosion, and sandstone fragments are the major limitations.

Clebit and Carnasaw soils are poorly suited to use as woodland. Adapted species include loblolly pine and shortleaf pine. The hazard of erosion and equipment limitation are severe. Seedling mortality is moderate for Clebit soils. Pirum soils are moderately suited to use as woodland. Adapted species include shortleaf pine, loblolly pine, southern red oak, and white oak. The hazard of erosion and equipment limitation are severe.

The soils in this association are poorly suited to urban uses. Depth to rock and slope of Clebit soils are severe limitations for dwellings, small commercial buildings, local roads and streets, and septic tank absorption fields. Shrink-swell and slope of Carnasaw soils are severe limitations for dwellings, small commercial buildings, and local roads and streets. Low strength is also a severe limitation for local roads and streets. Slow permeability and slope of Carnasaw soils are severe limitations for septic tank absorption fields. Slope of Pirum soils is a severe limitation for dwellings, small commercial buildings, local roads and streets, and septic tank absorption fields. Depth to rock is also a severe limitation for septic tank absorption fields.

Clebit soils are in capability unit VIIs-2 and woodland suitability group 5x3. Carnasaw soils are in capability unit VIIs-1 and woodland suitability group 5x3. Pirum soils are in capability unit VIIs-1 and woodland suitability group 4x9.

10—Enders gravelly fine sandy loam, 3 to 8 percent slopes. This deep, well drained, gently sloping soil is on ridgetops, side slopes, and plateaus. Areas range from 40 to 160 acres.

Typically, the surface layer is 8 inches thick. It is dark brown gravelly fine sandy loam in the upper 3 inches and strong brown gravelly loam in the lower 5 inches. The subsoil is yellowish red silty clay loam to a depth of 14 inches; yellowish red, mottled silty clay to a depth of 38 inches; and mottled light gray, red, and strong brown silty clay to a depth of 56 inches. The underlying material is red and gray, weak, laminar, and weathered shale grading to hard shale.

This soil is low in natural fertility and organic matter content. Reaction ranges from strongly acid to extremely acid throughout. Permeability is very slow, and available water capacity is medium. Runoff is medium, and the hazard of erosion is very severe.

Included with this soil in mapping are a few small areas of Leadvale, Linker, and Mountainburg soils.

Figure 4.—This area of the Clebit-Carnasaw-Pirum association, very steep, is in the Ouachita National Forest. The soils in this unit are mainly used for timber production and wildlife habitat.

This Enders soil is poorly suited to row crops. Nearly all the acreage is pasture. This soil is moderately suited to pasture. The principal plant is common bermudagrass. Other adapted pasture plants are bahiagrass, tall fescue, white clover, sericea lespedeza, and annual lespedeza. Winter small grain crops can be grown. The major limitations are the clayey subsoil and a very severe hazard of erosion. Crops respond well to fertilization, and tilth is easy to maintain.

This soil is moderately suited to use as woodland. Adapted species are loblolly pine, shortleaf pine, eastern redcedar, and southern red oak. There are no significant limitations to woodland use or management.

The Enders soil is poorly suited to most urban uses. High shrink-swell potential is a severe limitation for local roads and streets, dwellings, and small commercial buildings. Low strength is also a severe limitation for local roads and streets. Very slow permeability is a severe limitation for septic tank absorption fields. These limitations are difficult or impractical to overcome.

This soil is in capability unit IVe-1 and woodland suitability group 4o1.

11—Enders gravelly fine sandy loam, 8 to 12 percent slopes. This deep, well drained, moderately sloping soil is on ridgetops, side slopes, and plateaus. Areas range from 40 to 200 acres.

Typically, the surface layer is 8 inches thick. It is dark brown gravelly fine sandy loam in the upper 3 inches and strong brown gravelly loam in the lower 5 inches. The subsoil is yellowish red silty clay loam to a depth of 14 inches; yellowish red, mottled silty clay to a depth of 38 inches; and mottled light gray, red, and strong brown silty clay to a depth of 56 inches. The underlying material is red and gray, weak, laminar, and weathered shale grading to hard shale.

This soil is low in natural fertility and organic matter content. Reaction ranges from strongly acid to extremely acid throughout. Permeability is very slow, and available water capacity is medium. Runoff is medium, and the hazard of erosion is very severe.

Included with this soil in mapping are a few small areas of Linker and Mountainburg soils.

This Enders soil is unsuited to row crops. Nearly all the acreage is pasture. This soil is moderately suited to pasture. The principal plant is common bermudagrass. Other adapted pasture plants are bahiagrass, tall fescue, white clover, sericea lespedeza, and annual lespedeza. The major limitations are medium runoff and the very severe hazard of erosion. Crops respond well to fertilization, and tilth is easy to maintain.

This soil is moderately suited to use as woodland. Adapted species are loblolly pine, shortleaf pine, eastern redcedar, and southern red oak. There are no significant limitations to woodland use or management.

The Enders soil is poorly suited to most urban uses. High shrink-swell potential is a severe limitation for local roads and streets, dwellings, and small commercial buildings. Low strength is also a severe limitation for local roads and streets. Slope is a severe limitation for small commercial buildings. Very slow permeability is a severe limitation for septic tank absorption fields. These limitations are difficult or impractical to overcome.

This soil is in capability unit VIe-2 and woodland suitability group 4o1.

12—Enders stony fine sandy loam, 12 to 20 percent slopes. This deep, well drained, moderately steep soil is on ridgetops and side slopes. Areas range from 40 to 200 acres.

Typically, the surface layer is dark brown stony fine sandy loam about 2 inches thick. The next layer is strong brown stony loam to a depth of 6 inches. The subsoil is yellowish red silty clay loam to a depth of 12 inches; yellowish red, mottled silty clay to a depth of 36 inches; and mottled light gray, red, and strong brown silty clay to a depth of 46 inches. The underlying material is red and gray, weak, laminar, and weathered shale grading to hard shale.

This soil is low in natural fertility and organic matter content. Reaction ranges from strongly acid to extremely acid throughout. Permeability is very slow, and available water capacity is medium. Runoff is medium, and the hazard of erosion is very severe.

Included with this soil in mapping are a few small areas of Linker and Mountainburg soils and soils similar to this Enders soil but that are slightly more than 59 inches deep to weathered bedrock.

This Enders soil is unsuited to row crops. Nearly all of the acreage is mixed hardwoods and pine with an understory of little bluestem. This soil is moderately suited to pasture. The adapted pasture plants are bahiagrass, sericea lespedeza, and annual lespedeza. The major limitations are stones and the very severe hazard of erosion. Pasture crops respond well to fertilization.

This soil is moderately suited to woodland. Adapted species are loblolly pine, shortleaf pine, eastern redcedar, and southern red oak. Equipment limitation is moderate for woodland use and management.

The Enders soil is poorly suited to most urban uses. High shrink-swell potential and slope are severe limitations for local roads and streets, dwellings, and small commerical buildings. Low strength is also a severe limitation for local roads and streets. Very slow permeability and slope are severe limitations for septic tank absorption fields. These limitations are difficult or impractical to overcome.

This soil is in capability unit VIIs-1 and woodland suitability group 4x2.

13—Enders stony fine sandy loam, 20 to 45 percent slopes. This deep, well drained, steep soil is on ridgetops and side slopes. Areas range from 40 to 400 acres.

Typically, the surface layer is dark brown stony fine sandy loam about 2 inches thick. The next layer is strong brown stony loam to a depth of 6 inches. The subsoil is yellowish red silty clay loam to a depth of 12 inches; yellowish red, mottled silty clay to a depth of 36 inches; and mottled light gray, red, and strong brown silty clay to a depth of 46 inches. The underlying material is weak, laminar, and weathered shale grading to hard shale bedrock.

This soil is low in natural fertility and organic matter content. Reaction ranges from strongly acid to extremely acid throughout. Permeability is very slow, and available water capacity is medium. Runoff is medium, and the hazard of erosion is very severe.

Included with this soil in mapping are a few small areas of Linker and Mountainburg soils and soils similar to the Enders but that are slightly more than 59 inches deep to weathered bedrock.

This Enders soil is unsuited to row crops and pasture. Nearly all of the acreage is mixed hardwoods and pine with an understory of little bluestem. The major limitations are stones and the very severe hazard of erosion.

This soil is poorly suited to use as woodland. Adapted species are loblolly pine, shortleaf pine, eastern

redcedar, and southern red oak. The hazard of erosion and equipment limitation are severe limitations for woodland use and management.

The Enders soil is poorly suited to most urban uses. High shrink-swell potential and slope are severe limitations for local roads and streets, dwellings, and small commercial buildings. Low strength is also a severe limitation for local roads and streets. Very slow permeability and slope are severe limitations for septic tank absorption fields. These limitations are difficult or impractical to overcome.

This soil is in capability unit VIIs-1 and woodland suitability group 5x3.

14—Gallion silt loam, 0 to 1 percent slopes. This deep, level, well drained soil is on natural levees and low terraces of the Arkansas River. Areas range from 40 to 300 acres.

Typically, the surface layer is dark brown silt loam about 10 inches thick. The subsoil is reddish brown silty clay loam to a depth of 23 inches; yellowish red silty clay loam to a depth of 36 inches; and yellowish red silt loam to a depth of 50 inches. The underlying material is yellowish red silt loam to a depth of 72 inches or more.

This soil is high in natural fertility but low in organic matter content. Reaction of the surface layer and subsoil ranges from neutral to medium acid, and the underlying material ranges from mildly alkaline to slightly acid. Permeability is moderate, and available water capacity is high.

Included with this soil in mapping are a few small areas of Moreland and Roxana soils and small areas that flood less than once every two years. Also included are small areas that have 10 to 15 inches of very fine sandy loam over a very dark brown silt loam surface layer and areas that have a loam or clay loam texture in the subsoil.

This Gallion soil is well suited to most crops commonly grown in the county (fig. 5). Nearly all of the acreage is cultivated. The principle crop is soybeans. Adapted crops are cotton, corn, small grain, and truck crops. This soil is well suited to pasture. Adapted pasture plants are bahiagrass, bermudagrass, white clover, and tall fescue. Crops respond well to fertilization, and tilth is easy to maintain.

This soil is well suited to use as woodland. Adapted species are eastern cottonwood, pecan, sweetgum, and American sycamore. There are no significant limitations for woodland use or management.

The Gallion soil is moderately suited to most urban uses. Low strength and the shrink-swell potential are moderate limitations for local roads and streets. Shrink-swell potential is a moderate limitation for dwellings and small commercial buildings. Permeability is a moderate limitation for septic tank absorption fields. These limitations can be overcome by proper design of road beds and proper design of housing and building foundations.

Figure 5.—Soybean stubble on Gallion silt loam, 0 to 1 percent slopes. This soil has the highest average soybean yield in the county.

This soil is in capability unit I-1 and woodland suitability group 2o4.

15—Guthrie silt loam, occasionally flooded. This deep, poorly drained, level or nearly level soil is on stream terraces and upland flats and is in depressions. The soil becomes flooded for brief periods during January to April. Flooding occurs no more than once every 2 years (fig. 6). Slopes are 0 to 2 percent. Areas range from 60 to 400 acres.

Typically, the surface layer is grayish brown silt loam about 2 inches thick. The subsurface layer is gray silt loam to a depth of 8 inches. The subsoil is gray silt loam to a depth of 21 inches; brittle, gray, mottled silty clay loam to a depth of 30 inches; and brittle, light gray, mottled silty clay loam to a depth of 72 inches or more.

This soil is low in natural fertility and moderate in organic matter content. Reaction is very strongly acid or extremely acid, except where the surface layer has been limed. Permeability is slow, and available water capacity is medium. The water table is within a depth of 6 inches during winter and early in spring.

Included with this soil in mapping are a few small areas of Barling, Leadvale, and Taft soils.

This Guthrie soil is poorly suited to most crops

Figure 6.—Spring flooding on Guthrie silt loam, occasionally flooded.

commonly grown in the county. The main limitations are wetness and flooding. Surface drains are needed. Most of the acreage is mixed hardwoods. The principal row crop is soybeans. This soil is moderately suited to pasture (fig. 7). Adapted pasture plants are common bermudagrass, bahiagrass, white clover, sericea lespedeza, and tall fescue. Wetness is the main limitation for use and management. Crops respond well to fertilization. If this soil is adequately drained and properly managed, row crops that leave large amounts of residue can be grown year after year.

This soil is well suited to use as woodland. Adapted species are willow oak, sweetgum, and loblolly pine. Wetness is a severe limitation for equipment use in managing and harvesting the tree crop, but this limitation is usually overcome by logging during the drier seasons. Seedling mortality is a severe hazard because of wetness.

The Guthrie soil is poorly suited to most urban and residential uses. Flooding and wetness are severe limitations for dwellings, local roads and streets, and small commercial buildings. Low strength is also a severe limitation for local roads and streets. Flooding, slow permeability, and wetness are severe limitations for septic tank absorption fields. Overcoming these limitations is possible only if major flood control and drainage measures are used.

This soil is in capability unit IVw-1 and woodland suitability group 2w9.

16—Leadvale silt loam, 1 to 3 percent slopes. This deep, moderately well drained, nearly level soil is on

Figure 7.—Pasture being developed on Guthrie silt loam, occasionally flooded. This soil is moderately suited to pasture.

slightly concave toe slopes, benches, and terraces. Areas range from 20 to 200 acres.

Typically, the surface layer is dark brown silt loam about 6 inches thick. The subsoil is yellowish brown, mottled silty clay loam to a depth of 23 inches; compact and brittle, yellowish brown, mottled silty clay loam to a depth of 37 inches; and mottled yellowish brown and gray silty clay to a depth of 49 inches. The underlying material is weathered acid shale.

This soil is low in natural fertility and organic matter content. Reaction is strongly acid or very strongly acid, except where the surface layer has been limed. Permeability is moderately slow above the fragipan and slow in the fragipan, and available water capacity is medium. A perched water table is within a depth of 24 to 36 inches during winter and early in spring.

Included with this soil in mapping are a few small areas of Taft soils. Also included are small areas that are redder in the upper part of the subsoil.

This Leadvale soil is well suited to most crops commonly grown in the county. Soybeans is the principal crop. Among the other adapted crops are cotton, corn, and wheat. Most of the area is pasture (fig. 8). This soil is well suited to pasture. Adapted pasture plants are bahiagrass, common bermudagrass, tall fescue, white clover, and sericea lespedeza. The firm brittle layer in the subsoil restricts root penetration and slows the movement of water through the soil. The moderate hazard of erosion is the main limitation for use and management. Crops respond well to fertilization, and tilth is easy to maintain.

Figure 8.--Native grass pasture and scattered pine on Leadvale silt loam, 1 to 3 percent slopes.

This soil is well suited to use as woodland. Adapted species are loblolly pine and shortleaf pine. There are no major limitations for woodland use or management.

The Leadvale soil is moderately suited to most urban uses. Wetness is a moderate limitation for dwellings and small commercial buildings. Low strength and wetness are moderate limitations for local roads and streets. Moderately slow permeability and wetness are severe limitations for septic tank absorption fields. The severity of these limitations can be lessened through proper design of the absorption field and through drainage to lower the water table.

This soil is in capability unit IIe-1 and woodland suitability group 3o7.

17—Leadvale silt loam, 3 to 8 percent slopes. This deep, moderately well drained, gently sloping soil is on slightly concave toe slopes, benches, and terraces. Areas range from 40 to 120 acres.

Typically, the surface layer is dark brown silt loam about 6 inches thick. The subsoil is yellowish brown, mottled silty clay loam to a depth of 23 inches; compact and brittle, yellowish brown, mottled silty clay loam to a depth of 37 inches; and mottled, yellowish brown and gray silty clay to a depth of 49 inches. The underlying material is weathered acid shale.

This soil is low in natural fertility and organic matter content. Reaction is strongly acid or very strongly acid, except where the surface layer has been limed. Permeability is moderately slow above the fragipan and slow in the fragipan. The available water capacity is medium. The water table is perched within a depth of 24 to 36 inches during winter and early in spring.

Included with this soil in mapping are a few small areas of Taft soils. Also included are small areas of soils that are redder in the upper part of the subsoil and small areas of soils that are similar to the Leadvale soil but that are less than 48 inches deep to shale bedrock.

This Leadvale soil is moderately suited to most crops commonly grown in the county. Soybeans is the principal crop. Adapted crops are cotton, corn, and wheat. Most of the area is in pasture (fig. 9). This soil is well suited to pasture. Adapted pasture plants are bahiagrass, common bermudagrass, tall fescue, white clover, sericea lespedeza, and annual lespedeza. Crops respond well to fertilization, and tilth is easy to maintain. The firm, brittle layer in the subsoil restricts root penetration and slows the movement of water through the soil. A severe hazard of erosion is the main limitation for use and management.

This soil is well suited to use as woodland. Adapted species are loblolly pine, shortleaf pine, and eastern redcedar. There are no major limitations for woodland use or management.

The Leadvale soil is moderately suited to most urban uses. Wetness is a moderate limitation for dwellings. Low strength and wetness are moderate limitations for local roads and streets. Slope and wetness are moderate limitations for small commercial buildings. Moderately slow permeability and wetness are severe limitations for septic tank absorption fields. The severity of these limitations can be lessened through drainage to lower the water table and through proper design of the absorption field.

This soil is in capability unit IIIe-2 and woodland suitability group 3o7.

18—Linker fine sandy loam, 3 to 8 percent slopes. This moderately deep, well drained, gently sloping soil is on mountaintops, upper side slopes, and benches. Areas range from 10 to 200 acres.

Typically, the surface layer is dark grayish brown fine sandy loam about 4 inches thick. The subsurface layer is brown fine sandy loam to a depth of 8 inches. The subsoil is red sandy clay loam to a depth of 22 inches and red, mottled sandy clay loam to a depth of 36 inches. The underlying material is weathered sandstone to a depth of 40 inches and hard sandstone bedrock below a depth of 40 inches.

This soil is low in natural fertility and organic matter content. Reaction is strongly acid or very strongly acid throughout. Permeability is moderate, and available water capacity is medium.

Included with this soil in mapping are a few small areas of Leadvale and Mountainburg soils. Also included are small areas that have a silty subsoil, areas underlain by shale, areas that have a darker subsoil, small areas that have 10 to 30 percent by volume coarse fragments in the subsoil, and areas that have a slope of less than 3 percent.

This Linker soil is moderately suited to row crops and small grains. Nearly all of the acreage is pasture. This soil is moderately suited to pasture. The principal pasture plant is common bermudagrass. Adapted pasture crops are common bermudagrass, bahiagrass, tall fescue, white clover, sericea lespedeza, and annual lespedeza. The major limitations are depth to bedrock and the severe hazard of erosion. Crops respond well to fertilization, and tilth is easy to maintain.

This soil is moderately suited to use as woodland. Adapted species are shortleaf pine, loblolly pine, and eastern redcedar. There are no significant limitations for woodland use or management.

The Linker soil is moderately suited to most urban uses. Depth to bedrock is a moderate limitation for local roads and streets, dwellings, and small commercial buildings. Slope is also a moderate limitation for small commercial buildings. Depth to bedrock is a severe limitation for septic tank absorption fields. These limitations are difficult or impractical to overcome.

This soil is in capability unit IIIe-3 and woodland suitability group 4o1.

19—Linker fine sandy loam, 8 to 12 percent slopes. This moderately deep, well drained, moderately sloping soil is on mountaintops, lower side slopes, and benches. Areas range from 40 to 200 acres.

Typically, the surface layer is dark grayish brown fine sandy loam about 4 inches thick. The subsurface layer is brown fine sandy loam to a depth of 8 inches. The subsoil is red sandy clay loam to a depth of 22 inches and red, mottled sandy clay loam to a depth of 36 inches. The underlying material is weathered sandstone to a depth of 40 inches and hard sandstone bedrock below a depth of 40 inches.

This soil is low in natural fertility and organic matter content. Reaction is strongly acid or very strongly acid throughout. Permeability is moderate, and available water capacity is medium.

Included with this soil in mapping are a few small areas of Cane soils and Mountainburg soils. Also included are small areas that have a silty subsoil, areas underlain by shale, areas that have a darker subsoil, and small areas that have 10 to 30 percent by volume coarse fragments in the subsoil.

This Linker soil is poorly suited to row crops and small grains. Nearly all of the acreage is pasture. This soil is moderately suited to pasture. The principal plants are common bermudagrass, bahiagrass, tall fescue, white clover, sericea lespedeza, and annual lespedeza. The major limitations are depth to bedrock and the very severe hazard of erosion. Crops respond well to fertilization, and tilth is easy to maintain.

This soil is moderately suited to use as woodland. Adapted species are shortleaf pine, loblolly pine, and eastern redcedar. There are no significant limitations for woodland use or management.

The Linker soil is poorly suited to most urban uses. Depth to bedrock and slope are moderate limitations for local roads and streets and dwellings. Slope is a severe limitation for small commercial buildings. Depth to bedrock is a severe limitation for septic tank absorption fields. These limitations are difficult or impractical to overcome.

This soil is in capability unit IVe-2 and woodland suitability group 4o1.

20—McKamie silt loam, 3 to 8 percent slopes. This deep, well drained, gently sloping soil is on dissected stream terraces. Areas range from about 10 to 40 acres.

Typically, the surface layer is dark brown silt loam

about 2 inches thick. The subsurface layer is brown, mottled silt loam to a depth of 5 inches. The subsoil is red, mottled clay to a depth of 15 inches and red clay and silty clay to a depth of 43 inches. The underlying material is yellowish red, stratified very fine sandy loam, silt loam, and silty clay loam to a depth of 72 inches or more.

This soil is moderate in natural fertility but low in organic matter content. Reaction of the surface layer ranges from slightly acid to strongly acid, except where the surface layer has been limed. The upper part of the subsoil ranges from medium acid to very strongly acid. The lower part of the subsoil and the underlying material range from neutral to strongly acid. Permeability is very slow, and available water capacity is high. This soil erodes easily.

Included with this soil in mapping are a few small areas of Allen and Muskogee soils. Also included are areas of soils that are similar to the McKamie soil but that have a clayey substratum.

This McKamie soil is poorly suited to row crops. Most of the acreage is in pasture. This soil is moderately suited to pasture. Adapted pasture plants include bahiagrass, common bermudagrass, tall fescue, white clover, sericea lespedeza, and annual lespedeza. The major limitations are a clay subsoil that restricts root penetration and the very severe hazard of erosion (fig. 10).

This soil is well suited to use as woodland. Adapted species are loblolly pine and shortleaf pine. Management problems include the moderate equipment limitation and moderate seedling mortality caused by the clayey subsoil.

The McKamie soil is poorly suited to most urban uses. High shrink-swell potential is a severe limitation for dwellings, local roads and streets, and small commercial buildings (fig. 11). Low strength is also a severe limitation for local roads and streets. Very slow permeability is a severe limitation for septic tank absorption fields. These limitations are difficult or impractical to overcome.

This soil is in capability unit IVe-3 and woodland suitability group 3c2.

Figure 10.—Soybean stubble on McKamie silt loam, 3 to 8 percent slopes. The clay subsoil and very severe hazard of erosion are limitations for use and management.

Figure 11.—Homesites on McKamie silt loam, 3 to 8 percent slopes. This soil has severe limitations for dwellings.

21—Moreland silty clay, 0 to 1 percent slopes. This deep, somewhat poorly drained soil is on level backswamps of the Arkansas River. Areas range from 40 to 300 acres.

Typically, the surface layer is 17 inches thick. It is dark brown silty clay in the upper 5 inches and dark reddish brown silty clay in the lower 12 inches. The subsoil is dark reddish brown, mottled silty clay to a depth of 47 inches and reddish brown silty clay to a depth of 72 inches or more.

This soil is high in natural fertility, and organic matter content is moderate or high. Reaction of the surface layer ranges from mildly alkaline to slightly acid, and the subsoil ranges from moderately alkaline to neutral. Permeability is very slow, and available water capacity is high. When this soil is dry, it cracks. When it is wet, it expands. The water table is seasonally high and within a depth of 18 inches during winter and early in spring.

Included with this soil in mapping are a few small areas of Gallion and Perry soils. Also included are areas that have a clay surface layer, a few areas that have a dark surface layer less than 10 inches thick, and a few small areas that become flooded for short periods less than once every two years.

This Moreland soil is moderately suited to most crops commonly grown in the county if surface drainage is adequate. Most of the acreage is cultivated. The principal crops are rice and soybeans. Other adapted crops are cotton and grain sorghum. Wetness is the main limitation for use and management. Farming operations are commonly delayed several days after rain because of excess water. This soil is well suited to pasture. Adapted pasture plants include common bermudagrass, coastal bermudagrass, tall fescue, white clover, and vetch. Crops respond well to fertilization. Tilth is difficult to maintain because of high clay content

in the surface layer. In the surface layer, clods form if the soil is plowed when wet.

This soil is well suited to use as woodland. Adapted species are eastern cottonwood, American sycamore, and sweetgum. Wetness is a severe limitation for equipment use in managing and harvesting the crop, but it is usually overcome by logging during drier seasons. Seedling mortality is moderate as a result of wetness.

The Moreland soil is poorly suited to urban uses. Wetness and shrink-swell potential are severe limitations for dwellings and small commercial buildings. Low strength, wetness, and shrink-swell potential are severe limitations for local roads and streets. Very slow permeability and wetness are severe limitations for septic tank absorption fields. These limitations are difficult or impractical to overcome.

This soil is in capability unit IIIw-1 and woodland suitability group 2w6.

22—Mountainburg-Rock outcrop complex, 3 to 20 percent slopes. This complex consists of areas of a well drained, gently sloping to moderately steep soil on ridgetops and hillsides intermingled with areas of rock outcrop. The components of this complex are intermingled in such a pattern that it is not practical to map them separately. The soil formed in hard, massive, horizontally bedded sandstone with interbedded shales. Areas range from 60 to 2,000 acres.

The Mountainburg soil makes up about 45 percent of each mapped area. Typically, the surface layer is dark grayish brown stony fine sandy loam about 2 inches thick. The subsurface layer is yellowish brown stony fine sandy loam to a depth of 10 inches. The subsoil is strong brown very gravelly sandy clay loam to a depth of 19 inches. Hard, massive, sandstone bedrock is at a depth of 19 inches.

Rock outcrop makes up about 45 percent of each area. It consists of barren rock or as much as 3 inches of sandy soil material and fragments weathered from sandstone. Vegetation is sparse and has stunted growth in areas of weathered soil material.

The soil is low in natural fertility and organic matter content. Reaction is strongly acid or very strongly acid. Permeability is moderately rapid, and available water capacity is very low.

Included with this complex in mapping is about 10 percent small areas of Enders and Linker soils. Also included are small areas of shale breaks and areas of the Mountainburg soil that do not have rock outcrops.

The Mountainburg soil is unsuited to crops and pasture. Nearly all of the acreage is used as scrub woodland. The very low available water capacity and rock outcrops are limitations. Runoff is rapid, and the hazard of erosion is very severe.

This soil is poorly suited to use as woodland. Adapted species are shortleaf pine and eastern redcedar. Management problems include severe equipment limitations and moderate seedling mortality and hazard of erosion.

The Mountainburg soil is poorly suited to most urban uses. Large stones and depth to bedrock are severe limitations for dwellings, local roads and streets, small commercial buildings, and septic tank absorption fields. Slope is also a severe limitation for small commercial buildings. These limitations are difficult or impractical to overcome.

This soil is in capability unit VIIs-2 and woodland suitability group 5x3.

23—Muskogee silt loam, 1 to 3 percent slopes. This deep, moderately well drained soil is on nearly level high stream terraces. Areas range from 40 to 200 acres.

Typically, the surface layer is brown silt loam about 5 inches thick. The subsurface layer is yellowish brown, mottled silt loam to a depth of 10 inches. The subsoil is yellowish brown, mottled silty clay loam to a depth of 29 inches; mottled light brownish gray, yellowish red, and red silty clay to a depth of 50 inches; and red clay to a depth of 73 inches or more.

This soil is low in natural fertility and organic matter content. Reaction ranges from medium acid to very strongly acid in the surface layer and upper part of the subsoil and is medium acid or strongly acid in the lower part. Permeability is slow, and available water capacity is high. The water table is seasonally high and within a depth of 12 inches of the surface during winter and early in spring.

Included with this soil in mapping are a few small areas of Leadvale, McKamie, Guthrie, and Wrightsville soils.

This Muskogee soil is well suited to most crops commonly grown in the county. The main row crops are soybeans, cotton, and small grain. Most of the acreage is pasture (fig. 12). This soil is well suited to pasture. The principal pasture plant is common bermudagrass. Adapted pasture plants are bahiagrass, bermudagrass, tall fescue, white clover, sericea lespedeza, and annual lespedeza. The major limitation is the clayey subsoil and moderate hazard of erosion. The subsoil restricts root penetration and the movement of water through the soil.

This soil is well suited to use as woodland. Adapted species are loblolly pine, sweetgum, water oak, and shortleaf pine. There are no significant limitations for woodland use and management.

The Muskogee soil is poorly suited to most urban uses. High shrink-swell potential and wetness are severe limitations for dwellings, local roads and streets, and small commercial buildings. Slow permeability and wetness are severe limitations for septic tank absorption fields. These limitations are difficult or impractical to overcome.

This soil is in capability unit IIe-1 and woodland suitability group 3o7.

Figure 12.—Scattered pine and native grass pasture on Muskogee silt loam, 1 to 3 percent slopes.

24—Muskogee silt loam, 3 to 8 percent slopes. This deep, moderately well drained soil is on gently sloping high stream terraces. Areas range from 40 to 200 acres.

Typically, the surface layer is brown silt loam about 5 inches thick. The subsurface layer is yellowish brown, mottled silt loam to a depth of 10 inches. The subsoil is yellowish brown, mottled silty clay loam to a depth of 29 inches; mottled light brownish gray, yellowish red, and red silty clay to a depth of 50 inches; and red clay to a depth of 73 inches or more.

This soil is low in natural fertility and organic matter content. Reaction ranges from medium acid to very strongly acid in the surface layer and upper part of the subsoil and is medium acid or strongly acid in the lower part. Permeability is slow, and available water capacity is high. The water table is seasonally high and within a depth of 12 inches of the surface during winter and early in spring.

Included with this soil in mapping are a few small areas of Leadvale, McKamie, Guthrie, and Wrightsville soils.

This Muskogee soil is moderately suited to most crops commonly grown in the county. The main row crops are soybeans, cotton, and small grain. Most of the acreage is pasture. This soil is well suited to pasture. The principal pasture plant is common bermudagrass. Adapted pasture plants are bahiagrass, bermudagrass, tall fescue, white clover, sericea lespedeza, and annual lespedeza. The major limitations are the clayey subsoil

and the severe hazard of erosion. The subsoil restricts root penetration and movement of water through the soil.

This soil is moderately suited to use as woodland. Adapted species are loblolly pine, shortleaf pine, sweetgum, and water oak. There are no significant limitations for woodland use and management.

The Muskogee soil is poorly suited to most urban uses. High shrink-swell potential and wetness are severe limitations for dwellings, local roads and streets, and small commercial buildings. Slow permeability and wetness are severe limitations for septic tank absorption fields. These limitations are difficult or impractical to overcome.

This soil is in capability unit IIIe-2 and woodland suitability group 3o7.

25—Perry clay, occasionally flooded. This deep, poorly drained, level soil is on low backswamps near the Arkansas River and its tributaries. The soil is flooded for brief periods during December to June. Slopes are less than 1 percent. Areas range from 30 to 500 acres.

Typically, the surface layer is dark grayish brown, mottled clay about 6 inches thick. The upper part of the subsoil is gray, mottled clay to a depth of about 16 inches. The middle part is dark gray, mottled clay to a depth of about 24 inches. The lower part of the subsoil is dark reddish brown clay to a depth of about 40 inches. The underlying material is reddish brown clay to a depth of 72 inches or more.

This soil is moderate in natural fertility but low to moderate in organic matter content. Reaction in the surface layer ranges from medium acid to very strongly acid. Reaction in the upper part of the subsoil ranges from neutral to strongly acid, and the lower part ranges from moderately alkaline to slightly acid. Permeability is very slow, and available water capacity is high.

Included with this soil in mapping are a few small areas of Moreland soils, areas of soils that are less acid in the upper part of the subsoil, and areas that have a dark surface layer. Also included are small, low swales that flood at least once every two years.

This Perry soil is well suited to rice and soybeans and moderately suited to other crops commonly grown in the county (fig. 13). Most of the acreage is cultivated. Other crops include grain sorghum and pasture or hay grasses. Short season crops have higher potential than long season crops. This soil is well suited to pasture. Adapted species are bermudagrass, tall fescue, white clover, and bahiagrass. Because of the high clay content, this soil can only be cultivated in a narrow range of moisture content. It is difficult to prepare a seedbed and maintain good tilth. Wetness and flooding are the main limitations to use and management. Farming operations are delayed several days after rain, unless surface drainage is provided. This soil responds well to fertilization.

This soil is well suited to use as woodland. Adapted species are eastern cottonwood, sweetgum, and green ash. Wetness and flooding are severe limitations for equipment use and harvesting the tree crop. This limitation can be overcome by using special equipment and by logging during the drier seasons. Seedling mortality is moderate as a result of wetness and flooding.

The Perry soil is poorly suited to most urban uses. Wetness, flooding, and shrink-swell potential are severe limitations for dwellings and small commercial buildings. Low strength, wetness, and flooding are severe limitations for local roads and streets. Wetness, flooding, and very slow permeability are severe limitations for septic tank absorption fields. These limitations can be overcome only by using major flood control and drainage measures and special engineering design.

This soil is in capability unit IVw-1 and woodland suitability group 2w6.

26—Roxana very fine sandy loam, 0 to 1 percent slopes. This deep, well drained, level soil is on protected flood plains of the Arkansas River. Areas range from 50 to 250 acres.

Typically, the surface layer is reddish brown very fine sandy loam about 6 inches thick. The underlying material is yellowish red, dark brown and brown very fine sandy loam to a depth of 58 inches and strong brown very fine sandy loam to a depth of 72 inches or more.

This soil is high in natural fertility but low in organic matter content. Reaction of the surface layer is neutral or slightly acid, and the underlying material ranges from moderately alkaline to neutral. Permeability is moderate, and available water capacity is high.

Included with this soil in mapping are a few small areas of Gallion soils and areas that are fine sand to a depth of 40 inches or more. Also included are small, low areas that flood at least once every two years for short periods.

This Roxana soil is well suited to most crops commonly grown in the county. Nearly all of the acreage is cultivated. The principal crop is soybeans. Other adapted crops are corn and small grains. This soil is well suited to pasture. Adapted pasture plants include bahiagrass, bermudagrass, and white clover. Crops respond well to fertilization, and tilth is easy to maintain.

This soil is well suited to use as woodland. Adapted species are eastern cottonwood and American sycamore. There are no significant limitations for woodland use or management.

The Roxana soil is well suited to most urban uses. There are no major limitations for dwellings, local roads and streets, and small commercial buildings. Wetness and moderate permeability are moderate limitations for septic tank absorption fields.

This soil is in capability unit I-1 and woodland suitability group 1o4.

27—Roxana very fine sandy loam, 1 to 3 percent slopes. This deep, well drained, nearly level soil is on protected flood plains of the Arkansas River. Areas range from 50 to 350 acres.

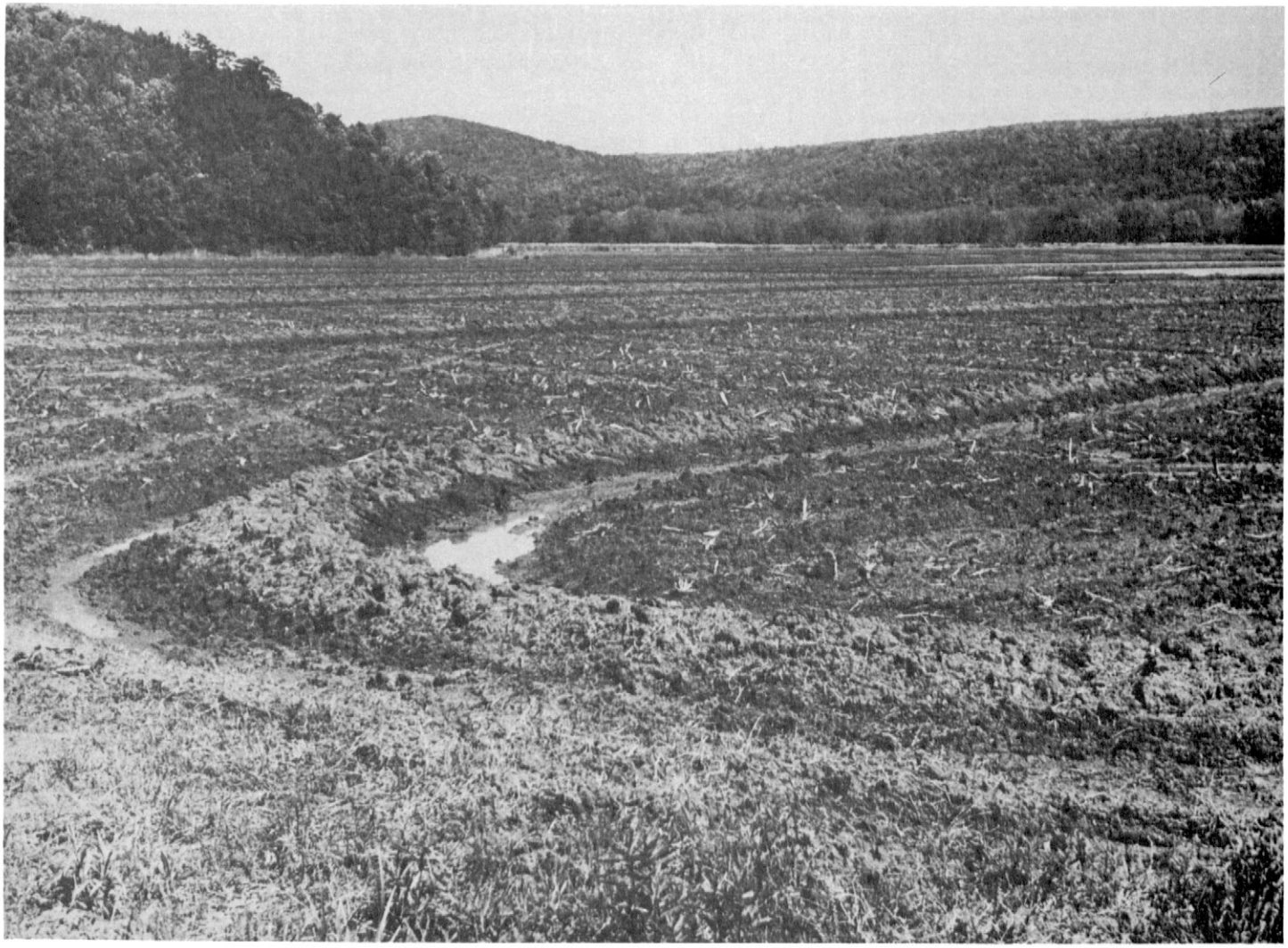


Figure 13.—Rice has been planted on Perry clay, occasionally flooded. An area of Carnasaw-Pirum-Clebit association, rolling, is in the background.

Typically, the surface layer is reddish brown very fine sandy loam about 6 inches thick. The underlying material is yellowish red, dark brown, and brown very fine sandy loam to a depth of 58 inches and strong brown very fine sandy loam to a depth of 72 inches or more.

This soil is high in natural fertility but low in organic matter content. Reaction in the surface layer is neutral or slightly acid. In the underlying material, reaction ranges from moderately alkaline to neutral. Permeability is moderate, and available water capacity is high.

Included with this soil in mapping are a few small areas of Gallion soils and areas that are fine sand to a depth of 40 inches or more. Also included are small, low areas that become flooded at least once every two years for short periods.

This Roxana soil is well suited to most crops commonly grown in the county. Nearly all of the acreage is cultivated. The principal crop is soybeans. Other adapted crops are corn and small grains. This soil is well suited to pasture. Adapted pasture plants include bahiagrass, bermudagrass, and white clover. The moderate hazard of erosion is the main limitation to use and management. Crops respond well to fertilization, and tilth is easy to maintain.

This soil is well suited to use as woodland. Adapted species are eastern cottonwood and American sycamore. No significant limitations exist for woodland use or management.

The Roxana soil is well suited to most urban uses. No major limitations exist for dwellings, roads and streets,

and small commercial buildings. Wetness and moderate permeability are moderate limitations for septic tank absorption fields.

This soil is in capability unit IIe-2 and woodland suitability group 1o4.

28—Sherwood fine sandy loam, 3 to 8 percent slopes. This moderately deep or deep, well drained, moderately permeable soil is on lower ridgetops and side slopes of mountains and on high terraces in the valleys of the mountains. Areas range from about 10 to 100 acres.

Typically, the surface layer is dark brown fine sandy loam about 7 inches thick. The subsurface layer is yellowish brown fine sandy loam to a depth of 16 inches. The subsoil is yellowish red gravelly clay loam to a depth of 36 inches and red, mottled gravelly clay loam to a depth of 43 inches. Below that is hard, tilted sandstone bedrock.

This soil is low in natural fertility and organic matter content. Reaction of the surface layer ranges from medium acid to very strongly acid, and the subsoil is strongly acid or very strongly acid. Permeability is moderate, and available water capacity is medium. The hazard of erosion is severe.

Included with this soil in mapping are a few large areas of Carnasaw, Leadvale, and Pirum soils.

This Sherwood soil is moderately suited to row crops and small grains, but nearly all of the acreage is in pasture. This soil is moderately suited to pasture. The principal pasture plant is common bermudagrass. Other adapted pasture plants are bahiagrass, tall fescue, white clover, sericea lespedeza, and annual lespedeza. Winter small grain crops can be grown. The major limitation is the severe hazard of erosion. This soil responds well to fertilization, and tilth is easy to maintain.

This soil is well suited to use as woodland. Adapted species are shortleaf pine, loblolly pine, southern red oak, and sweetgum. There are no significant limitations for woodland use or management.

The Sherwood soil is moderately suited to most urban uses. There are no major limitations for local roads and streets and dwellings. Slope is a moderate limitation for small commercial buildings. Depth to bedrock and moderate permeability are moderate limitations for septic tank absorption fields. These limitations are difficult to overcome.

This soil is in capability unit IIIe-3 and woodland suitability group 3o7.

29—Spadra fine sandy loam, 0 to 2 percent slopes. This deep, well drained, level and nearly level soil is on stream terraces. Flooding is rare and occurs only during periods of high intensity rainfall. Areas range from about 20 to 200 acres.

Typically, the surface layer is dark brown fine sandy loam about 7 inches thick. The subsoil is brown loam to a depth of 30 inches and brown sandy loam to a depth of 59 inches. The underlying material is brown fine sandy loam to a depth of 72 inches or more.

This soil is low in natural fertility and low to moderate in organic matter content. Reaction ranges from medium acid to very strongly acid throughout. Permeability is moderate, and available water capacity is high. Runoff is slow.

Included with this soil in mapping are a few small areas of Barling and Guthrie soils. Also included are small, low areas that flood less than once every two years for brief periods.

This Spadra soil is well suited to most crops commonly grown in the county. Most of the acreage is used as cropland. The principal crop is soybeans. Other adapted crops are corn and small grains. This soil is well suited to pasture. Adapted pasture plants include common bermudagrass, tall fescue, bahiagrass, white clover, sericea lespedeza, and annual lespedeza. A moderate hazard of erosion is the main limitation for use and management. Crops respond well to fertilization, and tilth is easy to maintain.

This soil is well suited to use as woodland. Adapted species are loblolly pine, shortleaf pine, and southern red oak. There are no major limitations for woodland use or management.

The Spadra soil is poorly suited to most urban uses. Rare flooding is a severe limitation for dwellings and small commercial buildings and a moderate limitation for local roads and streets. Rare flooding and moderate permeability are moderate limitations for septic tank absorption fields. The flooding limitation can be overcome only by major flood control measures.

This soil is in capability unit IIe-2 and woodland suitability group 2o7.

30—Taft silt loam, 0 to 1 percent slopes. This deep, somewhat poorly drained, slowly permeable, level and nearly level soil is on stream terraces and in depressions. Areas range from 40 to 80 acres.

Typically, the surface layer is dark grayish brown silt loam about 5 inches thick. The subsurface layer is pale brown, mottled silt loam to a depth of 11 inches. The subsoil is pale brown, mottled silty clay loam to a depth of 22 inches; yellowish brown and light gray, mottled, compact and brittle silty clay loam to a depth of 60 inches; and yellowish brown, mottled silty clay loam to a depth of 76 inches or more.

This soil is low in natural fertility and moderate in organic matter content. Reaction is strongly acid or very strongly acid throughout. Permeability is slow, and available water capacity is medium. The water table is seasonally high and within a depth of 24 inches during winter and early in spring.

Included with this soil in mapping are a few small areas of Barling, Leadvale, and Guthrie soils. Also included are a few low mounds.

This Taft soil is moderately suited to most crops commonly grown in the county. Nearly all of the acreage

is used as woodland. The principal cultivated crop is soybeans. Adapted crops are small grains. This soil is well suited to pasture. Adapted pasture plants are bermudagrass, tall fescue, white clover, bahiagrass, and sericea lespedeza. Tilth is easy to maintain. A fragipan, at a depth of 20 to 36 inches, restricts root penetration and movement of water through the soil. Wetness is the main limitation for use and management.

This soil is well suited to use as woodland. Adapted species are shortleaf pine and loblolly pine. Management problems include moderate equipment limitations and seedling mortality caused by wetness. The equipment limitation can be overcorne by logging during the drier seasons.

The Taft soil is poorly suited to most urban uses. Wetness is a severe limitation for dwellings and small commercial buildings. Low strength is a severe limitation for local roads and streets. Slow permeability and wetness are severe limitations for septic tank absorption fields. These limitations are difficult or impractical to overcome.

This soil is in capability unit IIIw-2 and woodland suitability group 3w8.

31—Wrightsville silt loam, 0 to 1 percent slopes. This deep, level, poorly drained soil is on stream terraces in the Arkansas Valley. Areas range from about 60 to 200 acres.

Typically, the surface layer is grayish brown silt loam to a depth of 3 inches. The subsurface layer is gray, mottled silt loam to a depth of 18 inches. Below this layer is gray, mottled silty clay loam to a depth of 32 inches. The subsoil is gray, mottled silty clay to a depth of 44 inches; grayish brown, mottled silty clay to a depth of 51 inches; and gray, mottled silty clay to a depth of 72 inches.

This soil is low in natural fertility and organic matter content. Reaction is strongly acid or very strongly acid throughout. Permeability is very slow, and available water capacity is high. The water table is seasonally high and within a depth of 18 inches during winter and early in spring.

Included with this soil in the mapping are a few small areas of Muskogee soils, a few small areas that have a clayey surface layer, and a few areas on mounds.

This Wrightsville soil is moderately suited to most crops commonly grown in the county. Most of the acreage is in mixed hardwoods and pasture. The principal cultivated crop is soybeans. This soil is moderately suited to pasture. Adapted pasture plants are common bermudagrass, bahiagrass, white clover, annual lespedeza, and sericea lespedeza. This soil responds well to fertilization. Wetness is the main limitation for use and management. If this soil is adequately drained and managed properly, row crops that leave large amounts of residue can be grown year after year.

This soil is moderately suited to use as woodland. Adapted species are loblolly pine, water oak, and sweetgum. Management problems include severe equipment limitations and a moderate seedling mortality as a result of wetness. The equipment limitation can be overcome by logging during the drier seasons. Seedling mortality is difficult to overcome.

This soil is poorly suited to most urban uses. Wetness and shrink-swell potential are severe limitations for dwellings, local roads and streets, and small commercial buildings. Low strength is also a severe limitation for local roads and streets. Wetness and very slow permeability are severe limitations for septic tank absorption fields. These limitations are difficult or impractical to overcome.

This soil is in capability unit IIIw-1 and woodland suitability group 4w9.

prime farmland

Prime farmland is one of several kinds of important farmlands defined by the U.S. Department of Agriculture. It is of major importance in providing the Nation's short- and long-range needs for food and fiber. The supply of high quality farmland is limited. The U.S. Department of Agriculture recognizes that responsible levels of government, as well as individuals, must encourage and facilitate the use of our Nation's prime farmland with wisdom and foresight.

Prime farmland, as defined by the U.S. Department of Agriculture, is land that is best suited to producing food, feed, forage, fiber, and oilseed crops. It has the quality, growing season, and moisture supply needed to economically produce a sustained high yield of crops if it is treated and managed using acceptable farming methods. Prime farmland produces the highest yields with minimal inputs of energy and economic resources. Farming it results in the least damage to the environment.

Prime farmland includes areas that are currently being used for crops, pasture, woodland, or other purposes. This land must either be used for producing food or fiber or be available for these uses. It does not include urban and built-up land or water areas. Urban land and built-up land are defined to be any contiguous unit of land 10 acres or more in size that is used for residences, industrial sites, commercial sites, construction sites, institutional sites, public administrative sites, railroad yards, small parks, cemeteries, airports, golf courses, sanitary landfills, sewage treatment plants, water control structures and spillways, shooting ranges, and so forth.

Prime farmland generally has an adequate and dependable supply of moisture from precipitation or irrigation. It also has a favorable temperature and growing season and an acceptable level of acidity or alkalinity. This land has few or no rocks and is permeable to water and air. Prime farmland is not excessively erosive or saturated with water for long periods and is not flooded during the growing season. Slope ranges mainly from 0 to 6 percent.

The detailed map units that make up prime farmland in Perry County are listed in this section. This list does not constitute a recommendation for particular land use. The extent of each listed map unit is shown in table 4. The location is shown on the detailed soil maps at the back of this publication. The soil qualities that affect use and management are described in the section "Detailed soil map units."

Soils that have limitations, such as a high water table, may qualify as prime farmland if the limitations are overcome by corrective measures, such as drainage. The map units in the following list consist of prime farmland, except where the use is urban or built-up land. The measures needed to overcome the limitations are shown in parentheses after the map unit name. Onsite evaluation is necessary to determine whether the limitations have been overcome by corrective measures.

1—Allen loam, 3 to 8 percent slopes
2—Barling silt loam, occasionally flooded
14—Gallion silt loam, 0 to 1 percent slopes
15—Guthrie silt loam, occasionally flooded (where adequately drained)
16—Leadvale silt loam, 1 to 3 percent slopes
18—Linker fine sandy loam, 3 to 8 percent slopes
21—Moreland silty clay, 0 to 1 percent slopes
23—Muskogee silt loam, 1 to 3 percent slopes
25—Perry clay, occasionally flooded
26—Roxana very fine sandy loam, 0 to 1 percent slopes
27—Roxana very fine sandy loam, 1 to 3 percent slopes
28—Sherwood fine sandy loam, 3 to 8 percent slopes
29—Spadra fine sandy loam, 0 to 2 percent slopes
30—Taft silt loam, 0 to 1 percent slopes
31—Wrightsville silt loam, 0 to 1 percent slopes

For more detailed information on the criteria for prime farmland, consult the local staff of the Soil Conservation Service.

About 67,000 acres, or nearly 19 percent of Perry County, meets the soil requirements for prime farmland. Areas are scattered throughout the county but most are in the southern part, mainly in general soil map units 3, 4, 5, and 6. Approximately 45,000 acres of this prime farmland is used for crops. Crops grown on this land, mainly rice and soybeans, account for an estimated two-thirds of the county's total agricultural income each year.

A recent trend in land use in some parts of the county has been the loss of some prime farmlands to recreation and urban uses. The loss of prime farmland to other uses puts pressure on marginal lands, which generally are more erosive, droughty, difficult to cultivate, and less productive.

use and management of the soils

This soil survey is an inventory and evaluation of the soils in the survey area. It can be used to adjust land uses to the limitations and potentials of natural resources and the environment. Also, it can help avoid soil-related failures in land uses.

In preparing a soil survey, soil scientists, conservationists, engineers, and others collect extensive field data about the nature and behavior characteristics of the soils. They collect data on erosion, droughtiness, flooding, and other factors that affect various soil uses and management. Field experience and collected data on soil properties and performance are used as a basis in predicting soil behavior.

Information in this section can be used to plan the use and management of soils for crops and pasture; as woodland; as sites for buildings, sanitary facilities, highways and other transportation systems, and parks and other recreation facilities; and for wildlife habitat. It can be used to identify the potentials and limitations of each soil for specific land uses and to help prevent construction failures caused by unfavorable soil properties.

Planners and others using soil survey information can evaluate the effect of specific land uses on productivity and on the environment in all or part of the survey area. The survey can help planners to maintain or create a land use pattern in harmony with the natural soil.

Contractors can use this survey to locate sources of sand and gravel, roadfill, and topsoil. They can use it to identify areas where bedrock, wetness, or very firm soil layers can cause difficulty in excavation.

Health officials, highway officials, engineers, and others may also find this survey useful. The survey can help them plan the safe disposal of wastes and locate sites for pavements, sidewalks, campgrounds, playgrounds, lawns, and trees and shrubs.

crops and pasture

The major management concerns for using the soils for crops and pasture are described in this section. In addition, the crops or pasture plants best suited to the soil, including some not commonly grown in the survey area, are discussed; the system of land capability classification used by the Soil Conservation Service is explained; and the predicted yields of the main crops and hay and pasture plants are presented for each soil.

This section provides information about the overall agricultural potential of the survey area and about the management practices that are needed. The information is useful for equipment dealers, land improvement contractors, fertilizer companies, processing companies, planners, conservationists, and others. For each kind of soil, information about management is presented in the section "Detailed soil map units." Planners of management systems for individual fields or farms should also consider the detailed information given in the description of each soil.

More than 40,390 acres in the survey area was used for crops and pasture in 1974, according to the Census of Agriculture. Of this total, 19,077 acres was harvested cropland (see tables 5 and 6).

The soils in Perry County have good potential for increased production of food. Food production could be increased considerably by extending the latest crop production technology to all cropland in the survey area. This soil survey can help facilitate the application of such technology.

Acreage in crops and pasture has been gradually decreasing. The use of this soil survey to help make land use decisions that influence the future role of farming in the survey area is discussed in the section "General soil map units."

Contour cultivation, terraces, grassed waterways, or a combination of these erosion control practices are needed on sloping soils that are used for clean-tilled crops. Row arrangement and suitable surface drainage are needed for dependable growth in wet areas. Many tracts that are subject to frequent flooding are unsuited or marginally suited to most crops commonly grown in the county.

Annual cover crops of grasses and legumes should be grown regularly in the cropping system if the hazard of erosion is severe or if the crops leave only small amounts of residue. Seedbed preparation should be delayed until spring to secure maximum benefit from residue. Crop residue should be shredded and spread evenly to provide the soils with protective cover and active organic matter.

A plowpan commonly develops in loamy soils that are improperly tilled or that are tilled frequently with heavy equipment. Keeping tillage to a minimum, varying the depth of tillage, and tilling when soil moisture content is favorable help to prevent formation of a plowpan. Growing deep-rooted grasses and legumes in the cropping system helps to break up plowpans.

If left bare of vegetation, many soils tend to become puddled or pack and crust during periods of heavy

rainfall. Growing cover crops and managing crop residue help to preserve or improve tilth.

Perennial grasses, legumes, or a mixture of these are grown for pasture and hay. A mixture generally consists of either a summer or a winter perennial grass and a suitable legume.

Coastal bermudagrass and common bermudagrass are the summer perennials most commonly grown. Bahiagrass is fairly common in this county and produces good quality forage. Tall fescue, the chief winter perennial grass now grown in the county, grows well only on soils that have a favorable soil-moisture relationship. All of these grasses respond well to fertilizer, particularly nitrogen. White clover, crimson clover, annual lespedeza, and sericea lespedeza are the most commonly grown legumes.

Proper grazing is essential for the production of high-quality forage, stand survival, and erosion control. Other treatment and management practices, such as brush and weed control, fertilization, and renovation of the pasture, are also important.

yields per acre

The average yields per acre that can be expected of the principal crops under a high level of management are shown in table 7. In any given year, yields may be higher or lower than those indicated in the table because of variations in rainfall and other climatic factors.

The yields are based mainly on the experience and records of farmers, conservationists, and extension agents. Available yield data from nearby counties and results of field trials and demonstrations are also considered.

The management needed to obtain the indicated yields of the various crops depends on the kind of soil and the crop. Management can include drainage, erosion control, and protection from flooding; the proper planting and seeding rates; suitable high-yielding crop varieties; appropriate and timely tillage; control of weeds, plant diseases, and harmful insects; favorable soil reaction and optimum levels of nitrogen, phosphorus, potassium, and trace elements for each crop; effective use of crop residue, barnyard manure, and green-manure crops; and harvesting that insures the smallest possible loss.

The estimated yields reflect the productive capacity of each soil for each of the principal crops. Yields are likely to increase as new production technology is developed. The productivity of a given soil compared with that of other soils, however, is not likely to change.

Crops other than those shown in table 7 are grown in the survey area, but estimated yields are not listed because the acreage of such crops is small. The local office of the Soil Conservation Service or of the Cooperative Extension Service can provide information about the management and productivity of the soils.

land capability classification

Land capability classification shows, in a general way, the suitability of soils for most kinds of field crops. Crops that require special management are excluded. The soils are grouped according to their limitations for field crops, the risk of damage if they are used for crops, and the way they respond to management. The grouping does not take into account major and generally expensive landforming that would change slope, depth, or other characteristics of the soils, nor does it consider possible but unlikely major reclamation projects. Capability classification is not a substitute for interpretations designed to show suitability and limitations of groups of soils for rangeland, for woodland, and for engineering purposes.

In the capability system, soils are generally grouped at three levels: capability class, subclass, and unit. These levels are defined in the following paragraphs.

Capability classes, the broadest groups, are designated by Roman numerals I through VIII. The numerals indicate progressively greater limitations and narrower choices for practical use. The classes are defined as follows:

Class I soils have slight limitations that restrict their use.

Class II soils have moderate limitations that reduce the choice of plants or that require moderate conservation practices.

Class III soils have severe limitations that reduce the choice of plants or that require special conservation practices, or both.

Class IV soils have very severe limitations that reduce the choice of plants or that require very careful management, or both.

Class V soils are not likely to erode but have other limitations, impractical to remove, that limit their use.

Class VI soils have severe limitations that make them generally unsuitable for cultivation.

Class VII soils have very severe limitations that make them unsuitable for cultivation.

Class VIII soils and miscellaneous areas have limitations that nearly preclude their use for commercial crop production.

Capability subclasses are soil groups within one class. They are designated by adding a small letter, *e, w, s,* or *c,* to the class numeral, for example, IIe. The letter *e* shows that the main limitation is risk of erosion unless close-growing plant cover is maintained; *w* shows that water in or on the soil interferes with plant growth or cultivation (in some soils the wetness can be partly corrected by artificial drainage); *s* shows that the soil is limited mainly because it is shallow, droughty, or stony; and *c*, used in only some parts of the United States, shows that the chief limitation is climate that is very cold or very dry.

In class I there are no subclasses because the soils of this class have few limitations. Class V contains only the

subclasses indicated by *w, s,* or *c* because the soils in class V are subject to little or no erosion. They have other limitations that restrict their use to pasture, rangeland, woodland, wildlife habitat, or recreation.

Capability units are soil groups within a subclass. The soils in a capability unit are enough alike to be suited to the same crops and pasture plants, to require similar management, and to have similar productivity. Capability units are generally designated by adding an Arabic numeral to the subclass symbol, for example, IIe-2 or IIIe-3.

The capability classification of each map unit is given in the section "Detailed soil map units."

woodland management and productivity

Paul I. Brown, forester, Soil Conservation Service, helped prepare this section.

The area which is now Perry County was originally covered with forests. Because of the predominantly mountainous terrain, settlement of the area caused only minor changes in land use patterns. Most of the land use shifts occurred on the Arkansas River bottoms, local stream terraces, and the flatter upland areas. Since the initial conversion of these areas to farmland, land use patterns have been relatively stable. Three separate surveys conducted by the United States Department of Agriculture, Forest Service, over a 30-year period indicate a stabilized forest land base of about 277,000 acres, or 77 percent of the county (*6, 7, 9*). Of this forested acreage, about 97,000 acres is either located within the boundaries of the Ouachita National Forest or administered by other federal or state agencies, 141,600 acres is owned by forest industry, and 38,400 acres is controlled by private individuals.

Good to poor stands of commercial trees are in this county. Needleleaf trees and a mixture of needleleaf and broadleaf trees are predominant on the uplands, while broadleaf trees are predominant on the bottom lands.

In Perry County, the value of forest products is substantial and accounts for a major part of the economic activity. Production on industrial and national forest lands is approaching its potential; however, the privately owned lands are producing well below their potential. In 1978, Perry County's softwood growing stock volume was 195.3 million cubic feet and the hardwood growing stock volume was 71.5 million cubic feet (*9*). In addition to wood production, the forests of Perry County are valuable for grazing, wildlife habitat, recreation, aesthetics, and soil and water conservation.

Table 8 can be used by woodland owners or forest managers in planning the use of soils for wood crops. Only those soils suitable for wood crops are listed. The table lists the woodland suitability group symbol for each soil. Soils assigned the same woodland suitability group symbol require the same general management and have about the same potential productivity.

The first part of the *woodland suitability group symbol*, a number, indicates the potential productivity of the soils for important trees. The number 1 indicates very high productivity; 2, high; 3, moderately high; 4, moderate; and 5, low. The second part of the symbol, a letter, indicates the major kind of soil limitation. The letter *x* indicates stoniness or rockiness; *w*, excessive water in or on the soil; *t*, toxic substances in the soil; *d*, restricted root depth; *c*, clay in the upper part of the soil; *s*, sandy texture; *f*, high content of coarse fragments in the soil profile; and *r*, steep slopes. The letter *o* indicates that limitations or restrictions are insignificant. If a soil has more than one limitation, the priority is as follows: x, w, t, d, c, s, f, and r.

The third element in the symbol, a numeral, indicates the kind of trees for which the soils in the group are best suited and also indicates the severity of the hazard or limitation. The numerals 1, 2, and 3 indicate slight, moderate, and severe limitations, respectively, and suitability for needleleaf trees. The numerals 4, 5, and 6 indicate slight, moderate, and severe limitations, respectively, and suitability for broadleaf trees. The numerals 7, 8, and 9 indicate slight, moderate, and severe limitations, respectively, and suitability for both needleleaf and broadleaf trees.

In table 8, *slight, moderate,* and *severe* indicate the degree of the major soil limitations to be considered in management.

Ratings of the *erosion hazard* indicate the risk of loss of soil in well managed woodland. The risk is *slight* if the expected soil loss is small, *moderate* if measures are needed to control erosion during logging and road construction, and *severe* if intensive management or special equipment and methods are needed to prevent excessive loss of soil.

Ratings of *equipment limitation* reflect the characteristics and conditions of the soil that restrict use of the equipment generally needed in woodland management or harvesting. A rating of *slight* indicates that use of equipment is not limited to a particular kind of equipment or time of year; *moderate* indicates a short seasonal limitation or a need for some modification in management or in equipment; and *severe* indicates a seasonal limitation, a need for special equipment or management, or a hazard in the use of equipment.

Seedling mortality ratings indicate the degree to which the soil affects the mortality of tree seedlings. Plant competition is not considered in the ratings. The ratings apply to seedlings from good stock that are properly planted during a period of sufficient rainfall. A rating of *slight* indicates that the expected mortality is less than 25 percent; *moderate*, 25 to 50 percent; and *severe*, more than 50 percent.

The *potential productivity* of merchantable or *common trees* on a soil is expressed as a *site index*. This index is the average height, in feet, that dominant and codominant trees of a given species attain in a specified number of years. The site index was determined at 30

years of age for eastern cottonwood, 35 years for American sycamore, and 50 years for all other species. The site index applies to fully stocked, even-aged, unmanaged stands. Commonly grown trees are those that woodland managers generally favor in intermediate or improvement cuttings. They are selected on the basis of growth rate, quality, value, and marketability.

Trees to plant are those that are suited to the soils and to commercial wood production.

recreation

The soils of the survey area are rated in table 9 according to limitations that affect their suitability for recreation. The ratings are based on restrictive soil features, such as wetness, slope, and texture of the surface layer. Susceptibility to flooding is considered. Not considered in the ratings, but important in evaluating a site, are the location and accessibility of the area, the size and shape of the area and its scenic quality, vegetation, access to water, potential water impoundment sites, and access to public sewerlines. The capacity of the soil to absorb septic tank effluent and the ability of the soil to support vegetation are also important. Soils subject to flooding are limited for recreation use by the duration and intensity of flooding and the season when flooding occurs. In planning recreation facilities, onsite assessment of the height, duration, intensity, and frequency of flooding is essential.

In table 9, the degree of soil limitation is expressed as slight, moderate, or severe. *Slight* means that soil properties are generally favorable and that limitations are minor and easily overcome. *Moderate* means that limitations can be overcome or alleviated by planning, design, or special maintenance. *Severe* means that soil properties are unfavorable and that limitations can be offset only by costly soil reclamation, special design, intensive maintenance, limited use, or by a combination of these measures.

The information in table 9 can be supplemented by other information in this survey, for example, interpretations for septic tank absorption fields in table 12 and interpretations for dwellings without basements and for local roads and streets in table 11.

Camp areas require site preparation such as shaping and leveling the tent and parking areas, stabilizing roads and intensively used areas, and installing sanitary facilities and utility lines. Camp areas are subject to heavy foot traffic and some vehicular traffic. The best soils have mild slopes and are not wet or subject to flooding during the period of use. The surface has few or no stones or boulders, absorbs rainfall readily but remains firm, and is not dusty when dry. Strong slopes and stones or boulders can greatly increase the cost of constructing campsites.

Picnic areas are subject to heavy foot traffic. Most vehicular traffic is confined to access roads and parking areas. The best soils for picnic areas are firm when wet, are not dusty when dry, are not subject to flooding during the period of use, and do not have slopes or stones or boulders that increase the cost of shaping sites or of building access roads and parking areas.

Playgrounds require soils that can withstand intensive foot traffic. The best soils are almost level and are not wet or subject to flooding during the season of use. The surface is free of stones and boulders, is firm after rains, and is not dusty when dry. If grading is needed, the depth of the soil over bedrock or a hardpan should be considered.

Paths and trails for hiking, horseback riding, and bicycling should require little or no cutting and filling. The best soils are not wet, are firm after rains, are not dusty when dry, and are not subject to flooding more than once a year during the period of use. They have moderate slopes and few or no stones or boulders on the surface.

wildlife habitat

Paul M. Brady, biologist, Soil Conservation Service, helped prepare this section.

Wildlife habitat abounds in Perry County. About 77 percent of the county is in forest, mostly mixed pine and hardwoods. The relatively small areas of cropland and pasture provide food for wildlife and add variety and interspersion of habitats. Such variety and interspersion are very important to wildlife in general, especially in an area so heavily dominated by one land use.

The Ouachita National Forest contains 93,335 acres (26 percent of the county) in the southern half of Perry County. The Arkansas Game and Fish Commission in conjunction with the U.S. Department of Agriculture, Forest Service, manages wildlife on the 160,000-acre Winona Wildlife Management Area, about 80,000 acres of which is in Perry County. They also manage Harris Brake Lake and Wildlife Management Area (2,500 acres).

The Ouachita National Forest and the Winona Wildlife Management Area are managed primarily for white-tailed deer, wild turkey, and squirrels. Harris Brake Wildlife Management Area (1,200 acres) and Harris Brake Lake (1,300 acres) constitute the major waterfowl area in the county. When the area is not flooded, there are excellent opportunities for hunting squirrel, rabbit, and raccoon.

Some major representative plant groups and species important to wildlife in the county include oaks, hickories, dogwoods, hawthorns, shortleaf pine, loblolly pine, eastern redcedar, blackberry, elderberry, viburnums, sumacs, greenbriers, soybeans, grain sorghum, fescue, bermudagrass, bahiagrass, crimson clover, big bluestem, little bluestem, broomsedge, switchgrass, threeawn, low panicum, ragweeds, annual lespedeza, vetches, tick clover, partridge pea, and wooly croton.

The wild turkey is the most outstanding game species in the county. Its large and steadily expanding population

throughout most of the area makes Perry County one of the best turkey hunting areas in Arkansas.

The Arkansas Game and Fish Commission reports that the white-tailed deer population is only fair, being suppressed by the lack of browse caused in part by the lack of timber harvesting and stand thinning and relatively small amounts of phosphorus in the soil.

Small animals are well represented in good populations of gray squirrels, cottontail, raccoon, bobcat, coyote, opossum, skunk, and armadillo. Bobwhite quail are periodically abundant at clear-cut areas for several years until vegetation becomes too dense. Quail also thrive in the farming areas and in certain areas of the forests, especially adjacent to the roads, trails, and clearings.

Populations of beaver, muskrat, mink, otter, and other furbearers are along the Fourche la Fave River and its tributaries, Harris Brake Lake, and other lakes, ponds, and streams in the county.

Aquatic resources are abundant in the county. About 1,100 farm ponds, several Public Law 566 watershed lakes, Harris Brake Lake, and other lakes provide habitat and fishing for largemouth bass, bluegills, redear sunfish, and channel catfish. These species and many more, including spotted bass, white bass, crappies, flathead catfish, suckers, bullheads, bowfins, gars, various sunfishes, minnows, and shiners, are in the Arkansas River along the northeastern county line and Fourche la Fave River.

Soils affect the kind and amount of vegetation that is available to wildlife as food and cover. They also affect the construction of water impoundments. The kind and abundance of wildlife depend largely on the amount and distribution of food, cover, and water. Wildlife habitat can be created or improved by planting appropriate vegetation, by maintaining the existing plant cover, or by promoting the natural establishment of desirable plants.

In table 10, the soils in the survey area are rated according to their potential for providing habitat for various kinds of wildlife. This information can be used in planning parks, wildlife refuges, nature study areas, and other developments for wildlife; in selecting soils that are suitable for establishing, improving, or maintaining specific elements of wildlife habitat; and in determining the intensity of management needed for each element of the habitat.

The potential of the soil is rated good, fair, poor, or very poor. A rating of *good* indicates that the element or kind of habitat is easily established, improved, or maintained. Few or no limitations affect management, and satisfactory results can be expected. A rating of *fair* indicates that the element or kind of habitat can be established, improved, or maintained in most places. Moderately intensive management is required for satisfactory results. A rating of *poor* indicates that limitations are severe for the designated element or kind of habitat. Habitat can be created, improved, or maintained in most places, but management is difficult and must be intensive. A rating of *very poor* indicates that restrictions for the element or kind of habitat are very severe and that unsatisfactory results can be expected. Creating, improving, or maintaining habitat is impractical or impossible.

The elements of wildlife habitat are described in the following paragraphs.

Grain and seed crops are domestic grains and seed-producing herbaceous plants. Soil properties and features that affect the growth of grain and seed crops are depth of the root zone, texture of the surface layer, available water capacity, wetness, slope, surface stoniness, and flood hazard. Soil temperature and soil moisture are also considerations. Examples of grain and seed crops are corn, wheat, oats, and barley.

Grasses and legumes are domestic perennial grasses and herbaceous legumes. Soil properties and features that affect the growth of grasses and legumes are depth of the root zone, texture of the surface layer, available water capacity, wetness, surface stoniness, flood hazard, and slope. Soil temperature and soil moisture are also considerations. Examples of grasses and legumes are fescue, lovegrass, bromegrass, clover, and alfalfa.

Wild herbaceous plants are native or naturally established grasses and forbs, including weeds. Soil properties and features that affect the growth of these plants are depth of the root zone, texture of the surface layer, available water capacity, wetness, surface stoniness, and flood hazard. Soil temperature and soil moisture are also considerations. Examples of wild herbaceous plants are bluestem, goldenrod, beggarweed, wheatgrass, and grama.

Hardwood trees and woody understory produce nuts or other fruit, buds, catkins, twigs, bark, and foliage. Soil properties and features that affect the growth of hardwood trees and shrubs are depth of the root zone, the available water capacity, and wetness. Examples of these plants are oak, poplar, cherry, sweetgum, apple, hawthorn, dogwood, hickory, blackberry, and blueberry. Examples of fruit-producing shrubs that are suitable for planting on soils rated *good* are Russian-olive, autumn-olive, and crabapple.

Coniferous plants furnish browse, seeds, and cones. Soil properties and features that affect the growth of coniferous trees, shrubs, and ground cover are depth of the root zone, available water capacity, and wetness. Examples of coniferous plants are pine and redcedar.

Wetland plants are annual and perennial wild herbaceous plants that grow on moist or wet sites. Submerged or floating aquatic plants are excluded. Soil properties and features affecting wetland plants are texture of the surface layer, wetness, reaction, salinity, slope, and surface stoniness. Examples of wetland plants are smartweed, wild millet, wildrice, saltgrass, cordgrass, rushes, sedges, and reeds.

Shallow water areas have an average depth of less than 5 feet. Some are naturally wet areas. Others are created by dams, levees, or other water-control

structures. Soil properties and features affecting shallow water areas are depth to bedrock, wetness, surface stoniness, slope, and permeability. Examples of shallow water areas are marshes, waterfowl feeding areas, and ponds.

The habitat for various kinds of wildlife is described in the following paragraphs.

Habitat for openland wildlife consists of cropland, pasture, meadows, and areas that are overgrown with grasses, herbs, shrubs, and vines. These areas produce grain and seed crops, grasses and legumes, and wild herbaceous plants. The wildlife attracted to these areas include bobwhite quail, meadowlark, field sparrow, cottontail, and red fox.

Habitat for woodland wildlife consists of areas of deciduous plants or coniferous plants or both and associated grasses, legumes, and wild herbaceous plants. Wildlife attracted to these areas include wild turkey, woodcock, thrushes, woodpeckers, squirrels, gray fox, raccoon, deer, and bear.

Habitat for wetland wildlife consists of open, marshy or swampy shallow water areas. Some of the wildlife attracted to such areas are ducks, geese, shore birds, muskrat, mink, and beaver.

engineering

James L. Janski, assistant state conservation engineer, Soil Conservation Service, helped prepare this section.

This section provides information for planning land uses related to urban development and to water management. Soils are rated for various uses, and the most limiting features are identified. The ratings are given in the following tables: Building site development, Sanitary facilities, Construction materials, and Water management. The ratings are based on observed performance of the soils and on the estimated data and test data in the "Soil properties" section.

Information in this section is intended for land use planning, for evaluating land use alternatives, and for planning site investigations prior to design and construction. The information, however, has limitations. For example, estimates and other data generally apply only to that part of the soil within a depth of 5 or 6 feet. Because of the map scale, small areas of different soils may be included within the mapped areas of a specific soil.

The information is not site specific and does not eliminate the need for onsite investigation of the soils or for testing and analysis by personnel experienced in the design and construction of engineering works.

Government ordinances and regulations that restrict certain land uses or impose specific design criteria were not considered in preparing the information in this section. Local ordinances and regulations need to be considered in planning, in site selection, and in design.

Soil properties, site features, and observed performance were considered in determining the ratings in this section. During the fieldwork for this soil survey, determinations were made about grain-size distribution, liquid limit, plasticity index, soil reaction, depth to bedrock, hardness of bedrock within 5 to 6 feet of the surface, soil wetness, depth to a seasonal high water table, slope, likelihood of flooding, natural soil structure aggregation, and soil density. Data were collected about kinds of clay minerals, mineralogy of the sand and silt fractions, and the kind of adsorbed cations. Estimates were made for erodibility, permeability, corrosivity, shrink-swell potential, available water capacity, and other behavioral characteristics affecting engineering uses.

This information can be used to (1) evaluate the potential of areas for residential, commercial, industrial, and recreation uses; (2) make preliminary estimates of construction conditions; (3) evaluate alternative routes for roads, streets, highways, pipelines, and underground cables; (4) evaluate alternative sites for sanitary landfills, septic tank absorption fields, and sewage lagoons; (5) plan detailed onsite investigations of soils and geology; (6) locate potential sources of gravel, sand, earthfill, and topsoil; (7) plan drainage systems, irrigation systems, ponds, terraces, and other structures for soil and water conservation; and (8) predict performance of proposed small structures and pavements by comparing the performance of existing similar structures on the same or similar soils.

The information in the tables, along with the soil maps, the soil descriptions, and other data provided in this survey can be used to make additional interpretations.

Some of the terms used in this soil survey have a special meaning in soil science and are defined in the Glossary.

building site development

Table 11 shows the degree and kind of soil limitations that affect shallow excavations, dwellings with and without basements, small commercial buildings, local roads and streets, and lawns and landscaping. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increases in construction costs, and possibly increased maintenance are required. Special feasibility studies may be required where the soil limitations are severe.

Shallow excavations are trenches or holes dug to a maximum depth of 5 or 6 feet for basements, graves, utility lines, open ditches, and other purposes. The ratings are based on soil properties, site features, and observed performance of the soils. The ease of digging, filling, and compacting is affected by the depth to

bedrock, a cemented pan, or a very firm dense layer; stone content; soil texture; and slope. The time of the year that excavations can be made is affected by the depth to a seasonal high water table and the susceptibility of the soil to flooding. The resistance of the excavation walls or banks to sloughing or caving is affected by soil texture and the depth to the water table.

Dwellings and small commercial buildings are structures built on shallow foundations on undisturbed soil. The load limit is the same as that for single-family dwellings no higher than three stories. Ratings are made for small commercial buildings without basements, for dwellings with basements, and for dwellings without basements. The ratings are based on soil properties, site features, and observed performance of the soils. A high water table, flooding, shrink-swell potential, and organic layers can cause the movement of footings. A high water table, depth to bedrock or to a cemented pan, large stones, and flooding affect the ease of excavation and construction. Landscaping and grading that require cuts and fills of more than 5 to 6 feet are not considered.

Local roads and streets have an all-weather surface and carry automobile and light truck traffic all year. They have a subgrade of cut or fill soil material, a base of gravel, crushed rock, or stabilized soil material, and a flexible or rigid surface. Cuts and fills are generally limited to less than 6 feet. The ratings are based on soil properties, site features, and observed performance of the soils. Depth to bedrock or to a cemented pan, a high water table, flooding, large stones, and slope affect the ease of excavating and grading. Soil strength (as inferred from the engineering classification of the soil), shrink-swell potential, frost action potential, and depth to a high water table affect the traffic supporting capacity.

sanitary facilities

Table 12 shows the degree and the kind of soil limitations that affect septic tank absorption fields, sewage lagoons, and sanitary landfills. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increases in construction costs, and possibly increased maintenance are required.

Table 12 also shows the suitability of the soils for use as daily cover for landfills. A rating of *good* indicates that soil properties and site features are favorable for the use and good performance and low maintenance can be expected; *fair* indicates that soil properties and site features are moderately favorable for the use and one or more soil properties or site features make the soil less desirable than the soils rated good; and *poor* indicates that one or more soil properties or site features are unfavorable for the use and overcoming the unfavorable properties requires special design, extra maintenance, or costly alteration.

Septic tank absorption fields are areas in which effluent from a septic tank is distributed into the soil through subsurface tiles or perforated pipe. Only that part of the soil between depths of 24 and 72 inches is evaluated. The ratings are based on soil properties, site features, and observed performance of the soils. Permeability, a high water table, depth to bedrock or to a cemented pan, and flooding affect absorption of the effluent. Large stones and bedrock or a cemented pan interfere with installation.

Unsatisfactory performance of septic tank absorption fields, including excessively slow absorption of effluent, surfacing of effluent, and hillside seepage, can affect public health. Ground water can be polluted if highly permeable sand and gravel or fractured bedrock is less than 4 feet below the base of the absorption field, if slope is excessive, or if the water table is near the surface. There must be unsaturated soil material beneath the absorption field to effectively filter the effluent. Many local ordinances require that this material be of a certain thickness.

Sewage lagoons are shallow ponds constructed to hold sewage while aerobic bacteria decompose the solid and liquid wastes. Lagoons should have a nearly level floor surrounded by cut slopes or embankments of compacted soil. Lagoons generally are designed to hold the sewage within a depth of 2 to 5 feet. Nearly impervious soil material for the lagoon floor and sides is required to minimize seepage and contamination of ground water.

Table 12 gives ratings for the natural soil that makes up the lagoon floor. The surface layer and, generally, 1 or 2 feet of soil material below the surface layer are excavated to provide material for the embankments. The ratings are based on soil properties, site features, and observed performance of the soils. Considered in the ratings are slope, permeability, a high water table, depth to bedrock or to a cemented pan, flooding, large stones, and content of organic matter.

Excessive seepage due to rapid permeability of the soil or a water table that is high enough to raise the level of sewage in the lagoon causes a lagoon to function unsatisfactorily. Pollution results if seepage is excessive or if floodwater overtops the lagoon. A high content of organic matter is detrimental to proper functioning of the lagoon because it inhibits aerobic activity. Slope, bedrock, and cemented pans can cause construction problems, and large stones can hinder compaction of the lagoon floor.

Sanitary landfills are areas where solid waste is disposed of by burying it in soil. There are two types of landfill—trench and area. In a trench landfill, the waste is placed in a trench. It is spread, compacted, and covered daily with a thin layer of soil excavated at the site. In an

area landfill, the waste is placed in successive layers on the surface of the soil. The waste is spread, compacted, and covered daily with a thin layer of soil from a source away from the site.

Both types of landfill must be able to bear heavy vehicular traffic. Both types involve a risk of ground water pollution. Ease of excavation and revegetation needs to be considered.

The ratings in table 12 are based on soil properties, site features, and observed performance of the soils. Permeability, depth to bedrock or to a cemented pan, a high water table, slope, and flooding affect both types of landfill. Texture, stones and boulders, highly organic layers, soil reaction, and content of salts and sodium affect trench type landfills. Unless otherwise stated, the ratings apply only to that part of the soil within a depth of about 6 feet. For deeper trenches, a limitation rated slight or moderate may not be valid. Onsite investigation is needed.

Daily cover for landfill is the soil material that is used to cover compacted solid waste in an area type sanitary landfill. The soil material is obtained offsite, transported to the landfill, and spread over the waste.

Soil texture, wetness, coarse fragments, and slope affect the ease of removing and spreading the material during wet and dry periods. Loamy or silty soils that are free of large stones or excess gravel are the best cover for a landfill. Clayey soils are sticky or cloddy and are difficult to spread; sandy soils are subject to soil blowing.

After soil material has been removed, the soil material remaining in the borrow area must be thick enough over bedrock, a cemented pan, or the water table to permit revegetation. The soil material used as final cover for a landfill should be suitable for plants. The surface layer generally has the best workability, more organic matter, and the best potential for plants. Material from the surface layer should be stockpiled for use as the final cover.

construction materials

Table 13 gives information about the soils as a source of roadfill, sand, gravel, and topsoil. The soils are rated *good, fair,* or *poor* as a source of roadfill and topsoil. They are rated as a probable or improbable source of sand and gravel. The ratings are based on soil properties and site features that affect the removal of the soil and its use as construction material. Normal compaction, minor processing, and other standard construction practices are assumed. Each soil is evaluated to a depth of 5 or 6 feet.

Roadfill is soil material that is excavated in one place and used in road embankments in another place. In this table, the soils are rated as a source of roadfill for low embankments, generally less than 6 feet high and less exacting in design than higher embankments.

The ratings are for the soil material below the surface layer to a depth of 5 or 6 feet. It is assumed that soil layers will be mixed during excavating and spreading. Many soils have layers of contrasting suitability within their profile. The table showing engineering index properties provides detailed information about each soil layer. This information can help determine the suitability of each layer for use as roadfill. The performance of soil after it is stabilized with lime or cement is not considered in the ratings.

The ratings are based on soil properties, site features, and observed performance of the soils. The thickness of suitable material is a major consideration. The ease of excavation is affected by large stones, a high water table, and slope. How well the soil performs in place after it has been compacted and drained is determined by its strength (as inferred from the engineering classification of the soil) and shrink-swell potential.

Soils rated *good* contain significant amounts of sand or gravel or both. They have at least 5 feet of suitable material, low shrink-swell potential, few cobbles and stones, and slopes of 15 percent or less. Depth to the water table is more than 3 feet. Soils rated *fair* are more than 35 percent silt- and clay-sized particles and have a plasticity index of less than 10. They have moderate shrink-swell potential, slopes of 15 to 25 percent, or many stones. Depth to the water table is 1 to 3 feet. Soils rated *poor* have a plasticity index of more than 10, a high shrink-swell potential, many stones, or slopes of more than 25 percent. They are wet, and the depth to the water table is less than 1 foot. They may have layers of suitable material, but the material is less than 3 feet thick.

Sand and gravel are natural aggregates suitable for commercial use with a minimum of processing. Sand and gravel are used in many kinds of construction. Specifications for each use vary widely. In table 13, only the probability of finding material in suitable quantity is evaluated. The suitability of the material for specific purposes is not evaluated, nor are factors that affect excavation of the material.

The properties used to evaluate the soil as a source of sand or gravel are gradation of grain sizes (as indicated by the engineering classification of the soil), the thickness of suitable material, and the content of rock fragments. Kinds of rock, acidity, and stratification are given in the soil series descriptions. Gradation of grain sizes is given in the table on engineering index properties.

A soil rated as a probable source has a layer of clean sand or gravel or a layer of sand or gravel that is up to 12 percent silty fines. This material must be at least 3 feet thick and less than 50 percent, by weight, large stones. All other soils are rated as an improbable source. Coarse fragments of soft bedrock, such as shale and siltstone, are not considered to be sand and gravel.

Topsoil is used to cover an area so that vegetation can be established and maintained. The upper 40 inches of a soil is evaluated for use as topsoil. Also evaluated is the reclamation potential of the borrow area.

Plant growth is affected by toxic material and by such properties as soil reaction, available water capacity, and fertility. The ease of excavating, loading, and spreading is affected by rock fragments, slope, a water table, soil texture, and thickness of suitable material. Reclamation of the borrow area is affected by slope, a water table, rock fragments, bedrock, and toxic material.

Soils rated *good* have friable loamy material to a depth of at least 40 inches. They are free of stones and cobbles, have little or no gravel, and have slopes of less than 8 percent. They are low in content of soluble salts, are naturally fertile or respond well to fertilizer, and are not so wet that excavation is difficult.

Soils rated *fair* are sandy soils, loamy soils that have a relatively high content of clay, soils that have only 20 to 40 inches of suitable material, soils that have an appreciable amount of gravel, stones, or soluble salts, or soils that have slopes of 8 to 15 percent. The soils are not so wet that excavation is difficult.

Soils rated *poor* are very sandy or clayey, have less than 20 inches of suitable material, have a large amount of gravel, stones, or soluble salts, have slopes of more than 15 percent, or have a seasonal water table at or near the surface.

The surface layer of most soils is generally preferred for topsoil because of its organic matter content. Organic matter greatly increases the absorption and retention of moisture and nutrients for plant growth.

water management

Table 14 gives information on the soil properties and site features that affect water management. The degree and kind of soil limitations are given for pond reservoir areas and embankments, dikes, and levees. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and are easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increase in construction costs, and possibly increased maintenance are required.

This table also gives for each soil the restrictive features that affect drainage, irrigation, terraces and diversions, and grassed waterways.

Pond reservoir areas hold water behind a dam or embankment. Soils best suited to this use have low seepage potential in the upper 60 inches. The seepage potential is determined by the permeability of the soil and the depth to fractured bedrock or other permeable material. Excessive slope can affect the storage capacity of the reservoir area.

Embankments, dikes, and levees are raised structures of soil material, generally less than 20 feet high, constructed to impound water or to protect land against overflow. In this table, the soils are rated as a source of material for embankment fill. The ratings apply to the soil material below the surface layer to a depth of about 5 feet. It is assumed that soil layers will be uniformly mixed and compacted during construction.

The ratings do not indicate the ability of the natural soil to support an embankment. Soil properties to a depth even greater than the height of the embankment can affect performance and safety of the embankment. Generally, deeper onsite investigation is needed to determine these properties.

Soil material in embankments must be resistant to seepage, piping, and erosion and have favorable compaction characteristics. Unfavorable features include less than 5 feet of suitable material and a high content of stones or boulders, organic matter, or salts or sodium. A high water table affects the amount of usable material. It also affects trafficability.

Drainage is the removal of excess surface and subsurface water from the soil. How easily and effectively the soil is drained depends on the depth to bedrock, to a cemented pan, or to other layers that affect the rate of water movement; permeability; depth to a high water table or depth of standing water if the soil is subject to ponding; slope; susceptibility to flooding; subsidence of organic layers; and potential frost action. Excavating and grading and the stability of ditchbanks are affected by depth to bedrock or to a cemented pan, large stones, slope, and the hazard of cutbanks caving. The productivity of the soil after drainage is adversely affected by extreme acidity or by toxic substances in the root zone, such as salts, sodium, or sulfur. Availability of drainage outlets is not considered in the ratings.

Irrigation is the controlled application of water to supplement rainfall and support plant growth. The design and management of an irrigation system are affected by depth to the water table, the need for drainage, flooding, available water capacity, intake rate, permeability, erosion hazard, and slope. The construction of a system is affected by large stones and depth to bedrock or to a cemented pan. The performance of a system is affected by the depth of the root zone, the amount of salts or sodium, and soil reaction.

Terraces and diversions are embankments or a combination of channels and ridges constructed across a slope to reduce erosion and conserve moisture by intercepting runoff. Slope, wetness, large stones, and depth to bedrock or to a cemented pan affect the construction of terraces and diversions. A restricted rooting depth, a severe hazard of wind or water erosion, an excessively coarse texture, and restricted permeability adversely affect maintenance.

Grassed waterways are natural or constructed channels, generally broad and shallow, that conduct surface water to outlets at a nonerosive velocity. Large stones, wetness, slope, and depth to bedrock or to a cemented pan affect the construction of grassed

waterways. A hazard of wind erosion, low available water capacity, restricted rooting depth, toxic substances such as salts or sodium, and restricted permeability adversely affect the growth and maintenance of the grass after construction.

soil properties

Data relating to soil properties are collected during the course of the soil survey. The data and the estimates of soil and water features, listed in tables, are explained on the following pages.

Soil properties are determined by field examination of the soils and by laboratory index testing of some benchmark soils. Established standard procedures are followed. During the survey, many shallow borings are made and examined to identify and classify the soils and to delineate them on the soil maps. Samples are taken from some typical profiles and tested in the laboratory to determine grain-size distribution, plasticity, and compaction characteristics.

Estimates of soil properties are based on field examinations, on laboratory tests of samples from the survey area, and on laboratory tests of samples of similar soils in nearby areas. Tests verify field observations, verify properties that cannot be estimated accurately by field observation, and help characterize key soils.

The estimates of soil properties shown in the tables include the range of grain-size distribution and Atterberg limits, the engineering classifications, and the physical and chemical properties of the major layers of each soil. Pertinent soil and water features also are given.

engineering index properties

Table 15 gives estimates of the engineering classification and of the range of index properties for the major layers of each soil in the survey area. Most soils have layers of contrasting properties within the upper 5 or 6 feet.

Depth to the upper and lower boundaries of each layer is indicated. The range in depth and information on other properties of each layer are given for each soil series under "Soil series and their morphology."

Texture is given in the standard terms used by the U.S. Department of Agriculture. These terms are defined according to percentages of sand, silt, and clay in the fraction of the soil that is less than 2 millimeters in diameter. "Loam," for example, is soil that is 7 to 27 percent clay, 28 to 50 percent silt, and less than 52 percent sand. If a soil contains particles coarser than sand, an appropriate modifier is added, for example, "gravelly." Textural terms are defined in the Glossary.

Classification of the soils is determined according to the Unified soil classification system (*2*) and the system adopted by the American Association of State Highway and Transportation Officials (*1*).

The Unified system classifies soils according to properties that affect their use as construction material. Soils are classified according to grain-size distribution of the fraction less than 3 inches in diameter and according to plasticity index, liquid limit, and organic matter content. Sandy and gravelly soils are identified as GW, GP, GM, GC, SW, SP, SM, and SC; silty and clayey soils as ML, CL, OL, MH, CH, and OH; and highly organic soils as Pt. Soils exhibiting engineering properties of two groups can have a dual classification, for example, SP-SM.

The AASHTO system classifies soils according to those properties that affect roadway construction and maintenance. In this system, the fraction of a mineral soil that is less than 3 inches in diameter is classified in one of seven groups from A-1 through A-7 on the basis of grain-size distribution, liquid limit, and plasticity index. Soils in group A-1 are coarse grained and low in content of fines (silt and clay). At the other extreme, soils in group A-7 are fine grained. Highly organic soils are classified in group A-8 on the basis of visual inspection.

If laboratory data are available, the A-1, A-2, and A-7 groups are further classified as A-1-a, A-1-b, A-2-4, A-2-5, A-2-6, A-2-7, A-7-5, or A-7-6. As an additional refinement, the suitability of a soil as subgrade material can be indicated by a group index number. Group index numbers range from 0 for the best subgrade material to 20 or higher for the poorest.

Rock fragments larger than 3 inches in diameter are indicated as a percentage of the total soil on a dry-weight basis. The percentages are estimates determined mainly by converting volume percentage in the field to weight percentage.

Percentage (of soil particles) passing designated sieves is the percentage of the soil fraction less than 3 inches in diameter based on an oven-dry weight. The sieves, numbers 4, 10, 40, and 200 (USA Standard Series), have openings of 4.76, 2.00, 0.420, and 0.074 millimeters, respectively. Estimates are based on laboratory tests of soils sampled in the survey area and in nearby areas and on estimates made in the field.

Liquid limit and *plasticity index* (Atterberg limits) indicate the plasticity characteristics of a soil. The estimates are based on test data from the survey area or from nearby areas and on field examination.

The estimates of grain-size distribution, liquid limit, and plasticity index are rounded to the nearest 5 percent.

Thus, if the ranges of gradation and Atterberg limits extend a marginal amount (1 or 2 percentage points) across classification boundaries, the classification in the marginal zone is omitted in the table.

physical and chemical properties

Table 16 shows estimates of some characteristics and features that affect soil behavior. These estimates are given for the major layers of each soil in the survey area. The estimates are based on field observations and on test data for these and similar soils.

Clay as a soil separate consists of mineral soil particles that are less than 0.002 millimeter in diameter. In this table, the estimated clay content of each major soil layer is given as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

The amount and kind of clay greatly affect the fertility and physical condition of the soil. They determine the ability of the soil to adsorb cations and to retain moisture. They influence shrink-swell potential, permeability, and plasticity, the ease of soil dispersion, and other soil properties. The amount and kind of clay in a soil also affect tillage and earth-moving operations.

Moist bulk density is the weight of soil (ovendry) per unit volume. Volume is measured when the soil is at field moisture capacity, that is, the moisture content at 1/3 bar moisture tension. Weight is determined after drying the soil at 105 degrees C. In this table, the estimated moist bulk density of each major soil horizon is expressed in grams per cubic centimeter of soil material that is less than 2 millimeters in diameter. Bulk density data are used to compute shrink-swell potential, available water capacity, total pore space, and other soil properties. The moist bulk density of a soil indicates the pore space available for water and roots. A bulk density of more than 1.6 can restrict water storage and root penetration. Moist bulk density is influenced by texture, kind of clay, content of organic matter, and soil structure.

Permeability refers to the ability of a soil to transmit water or air. The estimates indicate the rate of downward movement of water when the soil is saturated. They are based on soil characteristics observed in the field, particularly structure, porosity, and texture. Permeability is considered in the design of soil drainage systems, septic tank absorption fields, and construction where the rate of water movement under saturated conditions affects behavior.

Available water capacity refers to the quantity of water that the soil is capable of storing for use by plants. The capacity for water storage is given in inches of water per inch of soil for each major soil layer. The capacity varies, depending on soil properties that affect the retention of water and the depth of the root zone. The most important properties are the content of organic matter, soil texture, bulk density, and soil structure. Available water capacity is an important factor in the choice of plants or crops to be grown and in the design and management of irrigation systems. Available water capacity is not an estimate of the quantity of water actually available to plants at any given time.

Soil reaction is a measure of acidity or alkalinity and is expressed as a range in pH values. The range in pH of each major horizon is based on many field tests. For many soils, values have been verified by laboratory analyses. Soil reaction is important in selecting crops and other plants, in evaluating soil amendments for fertility and stabilization, and in determining the risk of corrosion.

Shrink-swell potential is the potential for volume change in a soil with a loss or gain in moisture. Volume change occurs mainly because of the interaction of clay minerals with water and varies with the amount and type of clay minerals in the soil. The size of the load on the soil and the magnitude of the change in soil moisture content influence the amount of swelling of soils in place. Laboratory measurements of swelling of undisturbed clods were made for many soils. For others, swelling was estimated on the basis of the kind and amount of clay minerals in the soil and on measurements of similar soils.

If the shrink-swell potential is rated moderate to very high, shrinking and swelling can cause damage to buildings, roads, and other structures. Special design is often needed.

Shrink-swell potential classes are based on the change in length of an unconfined clod as moisture content is increased from air-dry to field capacity. The change is based on the soil fraction less than 2 millimeters in diameter. The classes are *low*, a change of less than 3 percent; *moderate*, 3 to 6 percent; and *high*, more than 6 percent. *Very high*, greater than 9 percent, is sometimes used.

Erosion factor K indicates the susceptibility of a soil to sheet and rill erosion by water. Factor K is one of six factors used in the Universal Soil Loss Equation (USLE) to predict the average annual rate of soil loss by sheet and rill erosion in tons per acre per year. The estimates are based primarily on percentage of silt, sand, and organic matter (up to 4 percent) and on soil structure and permeability. Values of K range from 0.05 to 0.69. The higher the value the more susceptible the soil is to sheet and rill erosion by water.

Erosion factor T is an estimate of the maximum average annual rate of soil erosion by wind or water that can occur without affecting crop productivity over a sustained period. The rate is in tons per acre per year.

Organic matter is the plant and animal residue in the soil at various stages of decomposition.

In table 16, the estimated content of organic matter of the plow layer is expressed as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

The content of organic matter of a soil can be maintained or increased by returning crop residue to the soil. Organic matter affects the available water capacity,

infiltration rate, and tilth. It is a source of nitrogen and other nutrients for crops.

soil and water features

Table 17 gives estimates of various soil and water features. The estimates are used in land use planning that involves engineering considerations.

Hydrologic soil groups are used to estimate runoff from precipitation. Soils not protected by vegetation are assigned to one of four groups. They are grouped according to the intake of water when the soils are thoroughly wet and receive precipitation from long-duration storms.

The four hydrologic soil groups are:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a permanent high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

Flooding, the temporary inundation of an area, is caused by overflowing streams, by runoff from adjacent slopes, or by tides. Water standing for short periods after rainfall or snowmelt and water in swamps and marshes are not considered flooding.

Table 17 gives the frequency and duration of flooding and the time of year when flooding is most likely.

Frequency, duration, and probable dates of occurrence are estimated. Frequency is expressed as none, rare, common, occasional, and frequent. *None* means that flooding is not probable; *rare* that it is unlikely but possible under unusual weather conditions; *common* that it is likely under normal conditions; *occasional* that it occurs on an average of once or less in 2 years; and *frequent* that it occurs on an average of more than once in 2 years. Duration is expressed as *very brief* if less than 2 days, *brief* if 2 to 7 days, and *long* if more than 7 days. Probable dates are expressed in months; November-May, for example, means that flooding can occur during the period November through May.

The information is based on evidence in the soil profile, namely thin strata of gravel, sand, silt, or clay deposited by floodwater; irregular decrease in organic matter content with increasing depth; and absence of distinctive horizons that form in soils that are not subject to flooding.

Also considered are local information about the extent and levels of flooding and the relation of each soil on the landscape to historic floods. Information on the extent of flooding based on soil data is less specific than that provided by detailed engineering surveys that delineate flood-prone areas at specific flood frequency levels.

High water table (seasonal) is the highest level of a saturated zone in the soil in most years. The depth to a seasonal high water table applies to undrained soils. The estimates are based mainly on the evidence of a saturated zone, namely grayish colors or mottles in the soil. Indicated in table 17 are the depth to the seasonal high water table; the kind of water table—that is, perched, artesian, or apparent; and the months of the year that the water table commonly is high. A water table that is seasonally high for less than 1 month is not indicated in table 17.

An apparent water table is a thick zone of free water in the soil. It is indicated by the level at which water stands in an uncased borehole after adequate time is allowed for adjustment in the surrounding soil. An artesian water table is under hydrostatic head, generally beneath an impermeable layer. When this layer is penetrated, the water level rises in an uncased borehole. A perched water table is water standing above an unsaturated zone. In places an upper, or perched, water table is separated from a lower one by a dry zone.

Only saturated zones within a depth of about 6 feet are indicated. A plus sign preceding the range in depth indicates that the water table is above the surface of the soil. The first numeral in the range indicates how high the water rises above the surface. The second numeral indicates the depth below the surface.

Depth to bedrock is given if bedrock is within a depth of 5 feet. The depth is based on many soil borings and on observations during soil mapping. The rock is specified as either soft or hard. If the rock is soft or fractured, excavations can be made with trenching machines, backhoes, or small rippers. If the rock is hard or massive, blasting or special equipment generally is needed for excavation.

Risk of corrosion pertains to potential soil-induced electrochemical or chemical action that dissolves or weakens uncoated steel or concrete. The rate of corrosion of uncoated steel is related to such factors as soil moisture, particle-size distribution, acidity, and electrical conductivity of the soil. The rate of corrosion of concrete is based mainly on the sulfate and sodium content, texture, moisture content, and acidity of the soil. Special site examination and design may be needed if the combination of factors creates a severe corrosion

environment. The steel in installations that intersect soil boundaries or soil layers is more susceptible to corrosion than steel in installations that are entirely within one kind of soil or within one soil layer.

For uncoated steel, the risk of corrosion, expressed as *low*, *moderate*, or *high*, is based on soil drainage class, total acidity, electrical resistivity near field capacity, and electrical conductivity of the saturation extract.

For concrete, the risk of corrosion is also expressed as *low*, *moderate*, or *high*. It is based on soil texture, acidity, and amount of sulfates in the saturation extract.

classification of the soils

The system of soil classification used by the National Cooperative Soil Survey has six categories (*8*). Beginning with the broadest, these categories are the order, suborder, great group, subgroup, family, and series. Classification is based on soil properties observed in the field or inferred from those observations or from laboratory measurements. In table 18, the soils of the survey area are classified according to the system. The categories are defined in the following paragraphs.

ORDER. Ten soil orders are recognized. The differences among orders reflect the dominant soil-forming processes and the degree of soil formation. Each order is identified by a word ending in *sol*. An example is Ultisol.

SUBORDER. Each order is divided into suborders primarily on the basis of properties that influence soil genesis and are important to plant growth or properties that reflect the most important variables within the orders. The last syllable in the name of a suborder indicates the order. An example is Udult (*Ud*, meaning moist but not wet, plus *ult*, from Ultisol).

GREAT GROUP. Each suborder is divided into great groups on the basis of close similarities in kind, arrangement, and degree of development of pedogenic horizons; soil moisture and temperature regimes; and base status. Each great group is identified by the name of a suborder and by a prefix that indicates a property of the soil. An example is Hapludults (*Hapl*, meaning minimal horizonation, plus *udult*, the suborder of the Ultisols that have a udic moisture regime).

SUBGROUP. Each great group has a typic subgroup. Other subgroups are intergrades or extragrades. The typic is the central concept of the great group; it is not necessarily the most extensive. Intergrades are transitions to other orders, suborders, or great groups. Extragrades have some properties that are not representative of the great group but do not indicate transitions to any other known kind of soil. Each subgroup is identified by one or more adjectives preceding the name of the great group. The adjective *Typic* identifies the subgroup that typifies the great group. An example is Typic Hapludult.

FAMILY. Families are established within a subgroup on the basis of physical and chemical properties and other characteristics that affect management. Mostly the properties are those of horizons below plow depth where there is much biological activity. Among the properties and characteristics considered are particle-size class, mineral content, temperature regime, depth of the root zone, consistence, moisture equivalent, slope, and permanent cracks. A family name consists of the name of a subgroup preceded by terms that indicate soil properties. An example is fine-loamy, siliceous, thermic Typic Hapludults.

SERIES. The series consists of soils that have similar horizons in their profile. The horizons are similar in color, texture, structure, reaction, consistence, mineral and chemical composition, and arrangement in the profile. The texture of the surface layer or of the substratum can differ within a series.

soil series and their morphology

In this section, each soil series recognized in the survey area is described. The descriptions are arranged in alphabetic order.

Characteristics of the soil and the material in which it formed are identified for each series. The soil is compared with similar soils and with nearby soils of other series. A pedon, a small three-dimensional area of soil, that is typical of the series in the survey area is described. The detailed description of each soil horizon follows standards in the Soil Survey Manual (*5*). Many of the technical terms used in the descriptions are defined in Soil Taxonomy (*8*). Unless otherwise stated, colors in the descriptions are for moist soil. Following the pedon description is the range of important characteristics of the soils in the series.

The map units of each soil series are described in the section "Detailed soil map units."

Allen series

The Allen series consists of deep, well drained, moderately permeable soils that formed in loamy colluvium. The native vegetation is mainly hardwoods and pine with an understory of grasses. Slopes are 3 to 8 percent.

Allen soils are geographically associated with Leadvale, McKamie, Muskogee, and Wrightsville soils. Leadvale soils, which are on lower stream terraces, have a fine-silty control section and a fragipan. McKamie soils, which are on lower terraces, have a fine control section and very slow permeability. Muskogee soils, which are on lower adjacent terraces, have a fine-silty control

section and are moderately well drained. Wrightsville soils, which are on lower and depressional terraces, have a fine control section and are poorly drained.

Typical pedon of Allen loam, 3 to 8 percent slopes, in a pasture, NE1/4SE1/4SE1/4 sec. 23, T. 5 N., R. 17 W.

Ap—0 to 5 inches; dark yellowish brown (10YR 4/4) loam; weak fine granular structure; very friable; many fine and medium roots; strongly acid; abrupt smooth boundary.

B1—5 to 12 inches; yellowish red (5YR 5/8) loam; weak medium subangular blocky structure; firm; common fine roots; strongly acid; clear smooth boundary.

B21t—12 to 20 inches; yellowish red (5YR 5/8) sandy clay loam; moderate medium subangular blocky structure; firm; many thin patchy clay films on faces of peds; few fine roots and pores; very strongly acid; clear wavy boundary.

B22t—20 to 36 inches; yellowish red (5YR 5/6) sandy clay loam; common medium distinct yellowish red (2.5YR 4/8) and brownish yellow (10YR 6/8) mottles; moderate medium subangular blocky structure; firm; many thin patchy clay films on faces of peds; few fine roots and pores; few small pockets and streaks of clean sand grains on faces of peds; very strongly acid; clear wavy boundary.

B23t—36 to 48 inches; red (2.5YR 4/8) sandy clay loam; common medium distinct reddish yellow (7.5YR 6/8) and pale brown (10YR 6/3) mottles; moderate medium subangular blocky structure; few fine roots and pores; few thin patchy clay films on faces of peds; few small pockets and streaks of clean sand grains on faces of peds; very strongly acid; clear wavy boundary.

B24t—48 to 72 inches; red (2.5YR 5/8) sandy clay loam; few fine faint pale brown and strong brown mottles; moderate medium subangular blocky structure; few thin patchy clay films on faces of peds; few small pockets and streaks of clean sand grains on faces of peds; very strongly acid.

Thickness of the solum ranges from 60 to more than 80 inches. Reaction is strongly acid or very strongly acid throughout.

The A horizon has hue of 10YR, value of 4 or 5, and chroma of 3 or 4; or it has hue of 7.5YR, value of 4, and chroma of 4. Thickness of the A horizon ranges from 4 to 12 inches.

The B1 horizon has hue of 5YR or 7.5YR, value of 5 or 6, and chroma of 6 or 8. Texture is loam, fine sandy loam, or sandy clay loam.

The B2t horizon has hue of 5YR or 2.5YR, value of 4 or 5, and chroma of 6 or 8; or it is mottled in shades of brown, red, and yellow in the lower part. Texture is loam, sandy clay loam, or clay loam.

Barling series

The Barling series consists of deep, moderately well drained, moderately permeable soils. These soils formed in alluvium derived from residuum of siltstone, shale, and sandstone. The soils are on flood plains that are occasionally flooded for brief periods late in winter and early in spring. Native vegetation is mixed hardwoods. Slopes are 0 to 1 percent.

Barling soils are geographically associated with Guthrie, Leadvale, Spadra, and Taft soils. Guthrie soils are on lower terraces and in depressions; they have a fine-silty control section and a fragipan. Leadvale soils are on terraces and have a fine-silty control section and a fragipan. Spadra soils are on stream terraces, are well drained, and have a fine-loamy control section. Taft soils are on depressional terraces, have a fragipan, and are somewhat poorly drained.

Typical pedon of Barling silt loam, occasionally flooded, in a pasture, SW1/4SE1/4SE1/4 sec. 26, T. 4 N., R. 19 W.

Ap—0 to 4 inches; dark grayish brown (10YR 4/2) silt loam; weak fine granular structure; friable; many fine roots; medium acid; clear smooth boundary.

A12—4 to 8 inches; brown (10YR 5/3) silt loam; weak fine granular structure; friable; common medium roots and pores; medium acid; clear smooth boundary.

B1—8 to 19 inches; dark yellowish brown (10YR 4/4) silt loam; few medium faint pale brown (10YR 6/3) mottles; weak medium subangular blocky structure; friable; common medium roots and pores; strongly acid; gradual smooth boundary.

B21—19 to 39 inches; dark yellowish brown (10YR 4/4) silt loam; common medium distinct light brownish gray (10YR 6/2) mottles; weak medium subangular blocky structure; friable; few fine roots and pores; strongly acid; gradual smooth boundary.

B22—39 to 50 inches; yellowish brown (10YR 5/4) silt loam; common medium distinct dark yellowish brown (10YR 4/4) and gray (10YR 6/1) mottles; moderate medium subangular blocky structure; friable; few fine roots and pores; very strongly acid; gradual smooth boundary.

B23—50 to 75 inches; dark yellowish brown (10YR 4/4) silt loam; common coarse distinct gray (10YR 6/1) mottles; moderate medium subangular blocky structure; friable; few fine roots; very strongly acid.

Thickness of the solum is more than 60 inches. Reaction ranges from slightly acid to strongly acid in the A and B1 horizons and from slightly acid to very strongly acid in the B2 horizon. Depth to gray mottles ranges from 6 to 24 inches.

The A horizon has hue of 10YR, value of 5, and chroma of 3; or it has value of 4 and chroma of 2. Thickness of the A horizon ranges from 4 to 16 inches.

The B1 and B21 horizons have hue of 10YR, value of 4 or 5, and chroma of 3 or 4. They are mottled in shades of brown and gray. Texture is silt loam or loam.

The B22 and B23 horizons have hue of 10YR, value of 4 or 5, and chroma of 4; and they are mottled in shades of brown and gray. In some pedons the B23 horizon has hue of 10YR, value of 5 or 6, and chroma of 1 or 2; and it is mottled in shades of brown. Texture is silt loam or loam.

Cane series

The Cane series consists of deep, moderately well drained soils. Permeability is moderate above the fragipan and slow in the fragipan. These soils formed in colluvium, old alluvium, or valley fill from interbedded sandstone and shale. The soils are on convex slopes and toe slopes. Native vegetation is mixed pine and hardwoods. Slopes are 3 to 8 percent.

Cane soils are geographically associated with Carnasaw and Leadvale soils. Carnasaw soils are on uplands, have a clayey control section, and do not have a fragipan. Leadvale soils are on lower terraces and have a fine-silty control section.

Typical pedon of Cane fine sandy loam, 3 to 8 percent slopes, in a pasture, SW1/4NW1/4SW1/4 sec. 14, T. 5 N., R. 15 W.

Ap—0 to 10 inches; yellowish brown (10YR 5/4) fine sandy loam; weak medium granular structure; friable; common fine roots; strongly acid; abrupt smooth boundary.

B2t—10 to 29 inches; yellowish red (5YR 5/8) silty clay loam; weak medium subangular blocky structure; friable; thin patchy clay films on faces of peds; few fine pores; strongly acid; gradual wavy boundary.

Bx1—29 to 43 inches; red (2.5YR 4/8) silty clay loam; common medium distinct strong brown (7.5YR 5/6) mottles; weak coarse prismatic structure parting to weak medium subangular blocky; friable; compact and brittle; many thin patchy clay films on faces of peds; few fine roots in seams; few fine pores; seams of light brownish gray (10YR 6/2) silt loam between prisms; strongly acid; gradual wavy boundary.

Bx2—43 to 67 inches; red (2.5YR 4/8) silty clay loam, common medium distinct strong brown (7.5YR 5/6) mottles; weak coarse prismatic structure parting to moderate medium subangular blocky; firm; compact and brittle; many thin patchy clay films on faces of peds; few fine pores; seams of light brownish gray (10YR 6/2) silt loam between prisms; very strongly acid; gradual wavy boundary.

B3—67 to 94 inches; mottled red (2.5YR 4/8), light brownish gray (10YR 6/2), and reddish yellow (7.5YR 6/6) silty clay loam; moderate medium subangular blocky structure; firm; slightly brittle; thin patchy clay films on faces of peds; very strongly acid.

Thickness of the solum is more than 60 inches. Reaction is strongly acid or very strongly acid throughout. Depth to the fragipan ranges from 20 to 35 inches.

The A horizon has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 4; hue of 10YR, value of 5, and chroma of 6; or hue of 10YR, value of 4 or 5, and chroma of 3. Thickness of the A horizon ranges from 4 to 10 inches.

The B2t horizon has hue of 5YR, value of 4 or 5, and chroma of 4, 6, or 8. Texture is silty clay loam, clay loam, or sandy clay loam.

The Bx horizon has hue of 2.5YR or 5YR, value of 4 or 5, and chroma of 6 or 8. It is mottled in shades of brown, gray, yellow, and red. Texture is silty clay loam or clay loam.

The B3 horizon has hue of 2.5YR, value of 4 or 5, and chroma of 8. It is mottled in shades of brown, gray, or yellow. Texture is silty clay loam or clay loam.

Carnasaw series

The Carnasaw series consists of deep, well drained, slowly permeable soils. These soils formed in clayey residuum weathered from shale or interbedded sandstone and shale. The soils are on crests and side slopes of dissected plateaus and ridges. The native vegetation is oak, hickory, dogwood, and pine. Slopes are 3 to 60 percent.

Carnasaw soils are geographically associated with Cane, Ceda, Clebit, Leadvale, Pirum, and Sherwood soils. Cane soils are on adjacent terraces, have a fine-loamy control section, and have a fragipan. Ceda soils are on narrow flood plains, have a loamy-skeletal control section, and have rapid permeability. Clebit soils are on uplands, have a loamy-skeletal control section, and have a solum that is less than 20 inches thick. Leadvale soils are on adjacent terraces, have a fine-silty control section, and have a fragipan. Pirum soils are on adjacent side slopes, have a fine-loamy control section, and have moderate permeability. Sherwood soils are on adjacent uplands, have a fine-loamy control section, and have moderate permeability.

Typical pedon of Carnasaw stony silt loam, from a wooded area of Carnasaw-Pirum-Clebit association, steep, SW1/4NW1/4SE1/4 sec. 2, T. 2 N., R. 20 W.

O1—1 inch to 0; hardwood leaves.

A1—0 to 4 inches; dark brown (10YR 4/3) stony silt loam; weak fine granular structure; very friable; many fine and medium roots; about 15 percent by volume sandstone fragments more than 12 inches in diameter; medium acid; clear smooth boundary.

A2—4 to 11 inches; strong brown (7.5YR 5/6) loam; weak medium granular structure; friable; many fine roots; few fine pores; about 5 percent by volume fragments of shale and sandstone 1/4 inch to 3 inches in diameter; strongly acid; gradual wavy boundary.

B21t—11 to 27 inches; yellowish red (5YR 5/6) silty clay loam; moderate medium subangular blocky structure; friable; few thin patchy clay films on faces of peds; few fine roots and pores; about 5 percent by volume flat fragments of shale and sandstone 1/4 inch to 3 inches in diameter; strongly acid; gradual wavy boundary.

B22t—27 to 35 inches; yellowish red (5YR 5/8) silty clay; strong medium subangular blocky structure; firm; common continuous clay films on faces of peds; few fine roots and pores; many peds coated with red (2.5YR 4/6); about 10 percent by volume fragments of shale 1/4 inch to 3 inches in diameter; very strongly acid; gradual wavy boundary.

B23t—35 to 48 inches; yellowish red (5YR 5/6) silty clay; strong medium subangular blocky structure; firm; common continuous clay films on faces of peds; few fine roots and pores; about 10 percent by volume fragments of shale 1/4 inch to 3 inches in diameter; very strongly acid; clear irregular boundary.

Cr—48 to 60 inches; shale laminated with sandstone, tilted 30 degrees from a horizontal plane.

Thickness of the solum and depth to bedrock ranges from 40 to 60 inches. Because of the irregular boundary between the Bt horizon and the tilted bedrock, the depth to bedrock is extremely variable within short distances. Reaction in the A horizon is medium acid or strongly acid, and it is strongly acid or very strongly acid in the B horizon.

The A1 horizon has hue of 10YR, value of 4, and chroma of 3 or 2. The A2 horizon has hue of 10YR or 7.5YR, value of 5, and chroma of 4, 6, or 8. Texture of the A1 horizon is gravelly silt loam or stony silt loam, and texture of the A2 horizon is loam or stony loam. Thickness of the A horizon ranges from 5 to 14 inches.

The Bt horizon has hue of 5YR, value of 5, and chroma of 6 or 8. Texture of the B21t horizon is silty clay loam or clay loam. Texture of the B22t and B23t horizons is silty clay, clay, or the gravelly counterparts. Mottles in shades of red or brown are present in some pedons.

The Cr horizon is interbedded sandstone and shale tilted 20 to 40 degrees from the horizontal.

Ceda series

The Ceda series consists of deep, well drained, rapidly permeable soils that formed from alluvial material weathered from sandstone and shale. These soils are on narrow flood plains of streams. The soils flood at least once most years for very brief periods from January through June. Native vegetation is mixed hardwoods and shortleaf pine. Slopes are 0 to 3 percent.

Ceda soils are geographically associated with Carnasaw, Leadvale, and Pirum soils. Carnasaw soils are on adjacent uplands, have a clayey control section, and are slowly permeable. Leadvale soils are on adjacent terraces, have a fine-silty control section, and have a fragipan. Pirum soils are on lower colluvial slopes of the uplands, have a fine-loamy control section, and are moderately permeable.

Typical pedon of Ceda gravelly loam, frequently flooded, in a wooded creek bottom, SW1/4NE1/4NW1/4 sec. 24, T. 4 N., R. 19 W.

A1—0 to 6 inches; brown (10YR 4/3) gravelly loam; moderate fine granular structure; friable; many fine roots; 30 percent by volume water-worn quartz sandstone and shale pebbles 0.25 inch to 2.0 inches in diameter; medium acid; clear wavy boundary.

C1—6 to 25 inches; brown (7.5YR 4/4) very gravelly loam; massive; friable; few fine roots; 40 percent by volume water-worn quartz sandstone and shale pebbles 0.25 inch to 3.0 inches in diameter; medium acid; diffuse wavy boundary.

C2—25 to 72 inches; brown (7.5YR 4/4) very gravelly loam; massive; friable; 45 percent by volume water-worn quartz sandstone and shale pebbles 0.25 inch to 10 inches in diameter; medium acid.

Reaction of the soil is slightly acid or medium acid in all horizons.

The A horizon has hue of 10YR; value of 3, 4, or 5; and chroma of 2 or 3. The amount of coarse fragments ranges from 15 to 35 percent by volume in the A horizon. Thickness of the A horizon ranges from 5 to 16 inches.

The C horizon has hue of 10YR; value of 4, 5, or 6; and chroma of 2, 3, 4, or 6. It can have hue of 7.5YR, value of 4, and chroma of 4; or hue of 7.5YR, value of 5, and chroma of 6. Texture is very gravelly fine sandy loam or very gravelly loam. The amount of coarse fragments ranges from 35 to 50 percent by volume in the upper part of the C horizon and increases to as much as 85 percent by volume in the lower part of the C horizon.

Clebit series

The Clebit series consists of shallow, well drained soils. Permeability is moderately rapid. These soils formed in material weathered from sandstone. They are on ridgecrests and side slopes of forest uplands of the Ouachita Mountains. Native vegetation is oak, hickory, dogwood, and pine. Slopes are 3 to 60 percent.

Clebit soils are geographically associated with Carnasaw and Pirum soils. Carnasaw soils are on uplands, have a clayey control section, and have a solum that is more than 20 inches thick. Pirum soils are on lower colluvial slopes of the uplands, have a fine-loamy control section, and have a solum that is more than 20 inches thick.

Typical pedon of Clebit stony fine sandy loam, from an area of Clebit-Carnasaw-Pirum association, very steep, NE1/4NE1/4NW1/4 sec. 27, T. 3 N., R. 19 W.

A1—0 to 5 inches; very dark grayish brown (10YR 3/2) stony fine sandy loam; weak fine granular structure; very friable; many fine roots; about 20 percent by volume sandstone fragments more than 12 inches in diameter and 25 percent by volume fragments 2 millimeters to 3 inches in diameter; medium acid; clear smooth boundary.

B2—5 to 14 inches; strong brown (7.5YR 5/6) very gravelly fine sandy loam; moderate medium granular structure; friable; about 35 percent by volume sandstone fragments 0.25 inch to 3.0 inches in diameter; strongly acid; clear irregular boundary.

R—14 to 16 inches; hard, brown and red, fractured and tilted sandstone.

Thickness of the solum and depth to bedrock ranges from 10 to 20 inches. Reaction of the soil ranges from slightly acid to strongly acid.

The A horizon has hue of 10YR, value of 3 or 4, and chroma of 2 or 3. Coarse fragments of sandstone that range from 2 millimeters to 3 inches in diameter make up 25 to 35 percent by volume. Those fragments more than 3 inches in diameter make up 5 to 20 percent by volume. Thickness of the A horizon ranges from 4 to 6 inches.

The B horizon has hue of 10YR, value of 4 or 5, and chroma of 4, 5, or 6; or it has hue of 7.5YR, value of 5, and chroma of 4 or 6. Texture is very gravelly fine sandy loam or very gravelly loam. Coarse fragments of sandstone that range from 2 millimeters to 3 inches in diameter range from 35 to 50 percent by volume.

Enders series

The Enders series consists of deep, well drained, very slowly permeable soils. These soils formed in a thin layer of loamy material and clayey residuum weathered from shale or interbedded shale and sandstone. The soils are on crests and side slopes of dissected plateaus and ridges. Native vegetation is post oak, red oak, white oak, hickory, and shortleaf pine. Slopes are 3 to 45 percent.

Enders soils are geographically associated with Leadvale, Linker, and Mountainburg soils. Leadvale soils are on old stream terraces in broad valleys, have a fine-silty control section, and have a fragipan. Linker soils are on benches and mountain plateaus, have a fine-loamy control section, and have moderate permeability. Mountainburg soils are on ridgetops and ledges, have a loamy skeletal control section, and have a solum that is less than 20 inches thick.

Typical pedon of Enders stony fine sandy loam, 20 to 45 percent slopes, in a wooded area, SE1/4NE1/4NW1/4 sec. 31, T. 5 N., R. 19 W.

A11—0 to 2 inches; dark brown (10YR 4/3) stony fine sandy loam; weak fine granular structure; very friable; many fine roots; 15 percent by volume angular fragments of sandstone 1/4 inch to 12 inches in diameter; strongly acid; clear smooth boundary.

A12—2 to 6 inches; strong brown (7.5YR 5/6) stony loam; friable; weak medium granular structure; many fine roots and pores; 15 percent by volume angular fragments of sandstone 1/4 inch to 12 inches in diameter; very strongly acid; gradual wavy boundary.

B21t—6 to 12 inches; yellowish red (5YR 5/6) silty clay loam; moderate medium subangular blocky structure; firm; many thin patchy clay films on faces of peds; few fine roots and pores; extremely acid; gradual wavy boundary.

B22t—12 to 28 inches; yellowish red (5YR 4/6) silty clay; common medium distinct strong brown (7.5YR 5/6) mottles; moderate medium subangular blocky structure; firm; continuous clay films on faces of peds; few fine pores; extremely acid; gradual wavy boundary.

B23t—28 to 36 inches; yellowish red (5YR 5/6) silty clay; common medium distinct strong brown (7.5YR 5/6) mottles; moderate medium subangular blocky structure; very firm; continuous clay film on faces of peds; extremely acid; gradual wavy boundary.

B24t—36 to 46 inches; mottled light gray (10YR 6/1), red (2.5YR 5/6), and strong brown (7.5YR 5/6) silty clay; moderate medium subangular blocky structure; very firm; common thin patchy clay films on faces of peds; extremely acid; gradual wavy boundary.

Cr—46 to 72 inches; extremely acid, red and gray weathered laminar shale grading to hard laminar shale.

Thickness of the solum ranges from 32 to 59 inches, and depth to bedrock ranges from 40 to 60 inches. Reaction ranges from strongly acid to extremely acid throughout.

The A1 horizon has hue of 10YR, value of 3 or 4, and chroma of 2 or 3. The A12 horizon, if present, has hue of 10YR, value of 4 or 5, and chroma of 3 or 4; or it has hue of 7.5YR, value of 4 or 5, and chroma of 4; or hue of 7.5YR, value of 5, and chroma of 6. Texture is gravelly fine sandy loam, gravelly loam, stony fine sandy loam, or stony loam. Thickness of the A horizon ranges from 3 to 8 inches.

The B1 horizon, if present, has hue of 7.5YR, value of 5, and chroma of 4, 6, or 8. Texture is loam or silt loam. The B2t horizon has hue of 5YR or 2.5YR, value of 4 or 5, and chroma of 6 or 8. Texture is silty clay loam, silty clay, or clay. The lower part of the B2t horizon is mottled in shades of red, brown, and gray.

The Cr horizon is in shades of red, brown, and gray. It is extremely acid, weakly weathered laminar shale grading to hard shale bedrock.

Gallion series

The Gallion series consists of deep, well drained, moderately permeable soils. These soils formed in loamy alluvium on level natural levees and low terraces of the Arkansas River. Native vegetation is mixed hardwoods. Slopes are 0 to 1 percent.

Gallion soils are geographically associated with Moreland, Perry, and Roxana soils. Moreland soils are on backswamps and flood plains, have a fine control section, and are somewhat poorly drained. Perry soils are on lower backswamps, have a very fine control section, and are poorly drained. Roxana soils are on slightly lower flood plains and have a coarse-silty control section.

Typical pedon of Gallion silt loam, 0 to 1 percent slopes, in a soybean field, SE1/4SE1/4SE1/4 sec. 9, T. 5 N., R. 15 W.

Ap—0 to 10 inches; dark brown (7.5YR 4/2) silt loam; weak medium granular structure; friable; common fine roots; medium acid; clear smooth boundary.

B21t—10 to 23 inches; reddish brown (5YR 4/4) silty clay loam; weak medium subangular blocky structure; friable; thin patchy clay films on faces of peds; few fine roots and pores; medium acid; gradual wavy boundary.

B22t—23 to 36 inches; yellowish red (5YR 4/6) silty clay loam; moderate medium subangular blocky structure; firm; thin patchy clay films on faces of peds; few fine roots and pores; neutral; gradual wavy boundary.

B3—36 to 50 inches; yellowish red (5YR 4/6) silt loam; weak medium subangular blocky structure; friable; thin patchy clay films on faces of peds; neutral; gradual wavy boundary.

C—50 to 72 inches, yellowish red (5YR 4/6) silt loam; massive; firm; neutral.

Thickness of the solum ranges from 40 to 60 inches. Reaction ranges from neutral to medium acid in the A and B horizons. It ranges from mildly alkaline to slightly acid in the C horizon.

The Ap horizon has hue of 10YR, value of 4 or 5, and chroma of 2 or 3; or it has hue of 7.5YR, value of 4 or 5, and chroma of 2. Thickness of the A horizon ranges from 4 to 14 inches.

The B2t horizon has hue of 5YR; value of 3, 4, or 5; and chroma of 3 or 4. It can have hue of 5YR, value of 4 or 5, and chroma of 6. Texture is silt loam or silty clay loam. The B3 horizon has a range in color similar to the B2t horizon. Texture is silt loam, very fine sandy loam, or silty clay loam.

The C horizon has a range in color and texture similar to the B horizon. It may be stratified.

Guthrie series

The Guthrie series consist of deep, poorly drained, slowly permeable soils that formed in loamy sediments derived from residuum of weathered sandstone and shale. These soils are on upland flats and in depressions, and areas are saturated with water in winter and early in spring. Native vegetation is mixed hardwoods. Slopes are 0 to 2 percent.

Guthrie soils are geographically associated with Barling, Leadvale, and Spadra soils. Barling soils are on flood plains, have a coarse-silty control section, and do not have a fragipan. Leadvale soils are on higher terraces, have an argillic horizon above the fragipan, and are moderately well drained. Spadra soils are on low lying stream terraces, have a fine-loamy control section, and do not have a fragipan.

Typical pedon of Guthrie silt loam, occasionally flooded, in a hayfield, SE1/4NE1/4SE1/4 sec. 35, T. 4 N., R. 19 W.

Al—0 to 2 inches; grayish brown (10YR 5/2) silt loam, weak medium granular structure; friable; common medium roots; medium acid; gradual smooth boundary.

A2—2 to 8 inches; gray (10YR 5/1) silt loam; few fine faint yellowish brown mottles; friable; weak medium granular structure; friable; common medium roots; medium acid; gradual smooth boundary.

Blg—8 to 21 inches; gray (10YR 5/1) silt loam; few fine faint yellowish brown mottles; moderate thicks platy structure parting to weak medium subangular blocky; friable; few fine roots and pores; very strongly acid; gradual smooth boundary.

Bx1—21 to 30 inches; gray (10YR 5/1) silty clay loam; common medium distinct brownish yellow (10YR 6/8) and yellowish red (5YR 5/8) mottles; moderate thick platy structure parting to weak medium subangular blocky; friable; brittle; thin patchy clay films on faces of peds; few fine roots and pores; few black and brown concretions; very strongly acid; gradual wavy boundary.

Bx2—30 to 45 inches; light gray (10YR 6/1) silty clay loam; common medium distinct yellowish brown (10YR 5/8) mottles; moderate thick platy structure parting to moderate medium subangular blocky firm; brittle; thin patchy clay films on faces of peds; few fine pores; few black concretions; very strongly acid; gradual wavy boundary.

Bx3—45 to 72 inches; light gray (10YR 6/1) silty clay loam; common medium distinct yellowish brown (10YR 5/6) mottles; moderate thick platy structure parting to moderate medium subangular blocky; firm; brittle; thin patchy clay film on faces of peds; few black concretions; very strongly acid.

Thickness of the solum is more than 60 inches. Depth of the fragipan ranges from 20 to 40 inches. Reaction is

very strongly acid or extremely acid, except where the surface layer has been limed.

The A horizon has hue of 10YR, value of 5 or 6, and chroma of 1 or 2. Thickness of the A horizon ranges from 6 to 14 inches.

The Blg horizon has hue of 10YR; value of 5, 6, or 7; and chroma of 2 or less. Texture is silt loam or silty clay loam.

The Bx horizon has hue of 10YR, value of 5 or 6, and chroma of 2 or less. Texture is silt loam or silty clay loam. This horizon has few to many mottles of yellow, brown, and red. In some pedons, the Bx horizon is mottled gray, yellow, red, and brown but does not have a dominant color.

Leadvale series

The Leadvale series consists of deep, moderately well drained soils that have moderately slow or slow permeability in the fragipan. These soils formed in loamy material on the uplands or local loamy alluvium from nearby uplands underlain largely by shale and siltstone. These soils are on slightly concave toe slopes, benches, and terraces. Native vegetation is mixed hardwoods. Slopes are 1 to 8 percent.

Leadvale soils are geographically associated with Allen, Barling, Cane, Carnasaw, Ceda, Enders, Guthrie, Linker, Muskogee, Sherwood, and Taft soils. Allen soils are on higher stream terraces, have a fine-loamy control section, and do not have a fragipan. Barling soils are on flood plains, have a coarse-silty control section, and do not have a fragipan. Cane soils are on higher terraces and have a fine-loamy control section. Carnasaw soils are on adjacent uplands, have a clayey control section, and do not have a fragipan. Ceda soils are on flood plains of local streams, have a loamy-skeletal control section, and do not have a fragipan. Enders soils are on side slopes, have a clayey control section, and do not have a fragipan. Guthrie soils are on lower terraces and in depressional areas, do not have an argillic horizon above the fragipan, and are poorly drained. Linker soils are on higher mountain plateaus, side slopes, and terraces, have a fine-loamy control section, and do not have a fragipan. Muskogee soils are on lower terraces and do not have a fragipan. Sherwood soils are on adjacent side slopes, are well drained, and do not have a fragipan. Taft soils are on lower terraces, do not have an argillic horizon above the fragipan, and are somewhat poorly drained.

Typical pedon of Leadvale silt loam, 1 to 3 percent slopes, in a pasture, NW1/4NW1/4NW1/4 sec. 24, T. 4 N., R. 18 W.

Ap—0 to 6 inches; dark brown (10YR 4/3) silt loam; weak medium granular structure; friable; common fine roots; medium acid; clear smooth boundary.

B2t—6 to 23 inches; yellowish brown (10YR 5/6) silty clay loam; few medium brownish yellow (10YR 6/8) mottles; weak medium subangular blocky structure; friable; thin patchy clay films on faces of peds; few fine roots and pores; strongly acid; clear wavy boundary.

Bx—23 to 37 inches; yellowish brown (10YR 5/6) silty clay loam; common medium distinct light gray (10YR 7/2) mottles; weak platy structure parting to moderate medium subangular blocky; brittle and firm; thin patchy clay films on faces of peds; few fine black and brown concretions; very strongly acid; gradual wavy boundary.

B3—37 to 49 inches; mottled yellowish brown (10YR 5/6) and gray (10YR 6/1) silty clay; moderate medium subangular blocky structure; firm; very strongly acid; gradual wavy boundary.

Cr—49 to 54 inches; acid shale.

Reaction is strongly acid or very strongly acid, except where the surface layer has been limed. Depth to the fragipan ranges from 16 to 38 inches. Depth to bedrock ranges from 48 to more than 90 inches.

The A horizon ranges from 5 to 10 inches in thickness. It has hue of 10YR; value of 4, 5, or 6; and chroma of 3. It can have value of 4 and chroma of 2.

The B2t horizon has hue of 10YR, value of 5 or 6, and chroma of 6 or 8; or it has hue of 7.5YR, value of 5, and chroma of 6 or 8. Texture is silt loam or silty clay loam. The Bx horizon has a range in color and texture similar to the B2t horizon. The Bx horizon has mottles in shades of brown, gray, and yellow. This horizon is compact and brittle. The B3 horizon has a range in color similar to the Bx horizon. Texture is silty clay loam, silty clay, or clay.

The C horizon ranges from silt loam to relict rock structure of acid shale.

Linker series

The Linker series consist of moderately deep, well drained, moderately permeable soils that formed in loamy residuum weathered from sandstone. These soils are on mountaintops, upper side slopes, and benches. Native vegetation is mixed hardwoods and pine forest. Slopes are 3 to 12 percent.

Linker soils are geographically associated with Enders, Leadvale, and Mountainburg soils. Enders soils are on side slopes, have a clayey control section, and have very slow permeability. Leadvale soils are on low terraces, have a fine-silty control section, and have a fragipan. The Mountainburg soils are on ridgetops and ledges, are less than 20 inches deep to bedrock, and have a loamy-skeletal control section.

Typical pedon of Linker fine sandy loam, 3 to 8 percent slopes, in a pasture, SE1/4NW1/4SW1/4 sec. 19, T. 5 N., R. 18 W.

Ap—0 to 4 inches; dark grayish brown (10YR 4/2) fine sandy loam; weak medium granular structure; friable; many fine roots; strongly acid; clear smooth boundary.

A2—4 to 8 inches; brown (7.5YR 5/4) fine sandy loam; weak medium subangular blocky structure; friable; common fine roots; few fine pores; very strongly acid; gradual wavy boundary.
B21t—8 to 22 inches; red (2.5YR 4/8) sandy clay loam; moderate medium subangular blocky structure; friable; common thin patchy clay films on faces of peds; few fine roots and pores; very strongly acid; gradual wavy boundary.
B22t—22 to 36 inches; red (2.5YR 4/8) sandy clay loam; common medium distinct strong brown (7.5YR 5/6) mottles; moderate medium subangular blocky structure; friable; continuous clay films on faces of peds; few fine roots and pores; about 10 percent by volume weathered sandstone; very strongly acid; abrupt wavy boundary.
Cr—36 to 40 inches; weathered acid sandstone bedrock.
R—40 inches; hard sandstone bedrock.

Thickness of the solum and depth to bedrock range from 20 to 40 inches. Reaction is strongly acid or very strongly acid throughout.

The A horizon has hue of 10YR, value of 4 or 5, and chroma of 3; hue of 10YR, value of 4, and chroma of 2 or 4; or hue of 7.5YR, value of 4 or 5, and chroma of 4. Thickness of the A horizon ranges from 4 to 9 inches.

The B2t horizon has hue of 2.5YR or 5YR, value of 4 or 5, and chroma of 6 or 8. Texture is sandy clay loam or clay loam.

McKamie series

The McKamie series consists of deep, well drained, very slowly permeable soils that formed in clayey alluvium. These soils are on dissected stream terraces. Native vegetation is pine forest. Slopes are 3 to 8 percent.

McKamie soils are geographically associated with Allen and Muskogee soils. Allen soils are on adjacent terraces, have a fine-loamy control section, and have moderate permeability. Muskogee soils are on lower terraces, have a fine-silty control section, and are mottled in the argillic horizon.

Typical pedon of McKamie silt loam, 3 to 8 percent slopes, in a cultivated field, NW1/4NW1/4SW1/4 sec. 13, T. 5 N., R. 15 W.

Ap—0 to 2 inches; dark brown (10YR 4/3) silt loam; weak medium granular structure; friable; many fine roots; few fine pores; neutral; clear smooth boundary.
A2—2 to 5 inches; brown (7.5YR 5/4) silt loam; few fine faint light brown mottles; weak medium granular structure; friable; common fine roots and pores; neutral; abrupt smooth boundary.
B21t—5 to 15 inches; red (2.5YR 4/8) clay; few medium faint light yellowish brown (10YR 6/4) mottles; moderate medium subangular blocky structure; very firm; many thin patchy clay films on faces of peds; few fine roots; strongly acid; gradual smooth boundary.
B22t—15 to 36 inches; red (2.5YR 4/8) clay; moderate medium subangular blocky structure; very firm; continuous clay films on faces of peds; common slickensides; few fine roots; neutral; clear wavy boundary.
B3—36 to 43 inches; red (2.5YR 4/6) silty clay; moderate medium subangular blocky structure; firm; common slickensides; few fine roots; strongly acid; gradual smooth boundary.
IIC—43 to 72 inches; yellowish red (5YR 5/8) stratified very fine sandy loam, silt loam, and silty clay loam; strongly acid.

Thickness of the solum ranges from 36 to 60 inches. Reaction of the A horizon ranges from slightly acid to strongly acid, except where the surface layer has been limed. Reaction in the upper part of the B horizon ranges from medium acid to very strongly acid. Reaction in the lower part of the B horizon and in the C horizon ranges from neutral to strongly acid. Horizons below a depth of 30 inches may be alkaline or calcareous.

The A horizon has hue of 10YR, value of 4 or 5, and chroma of 3; or it has hue of 7.5YR, value of 4 or 5, and chroma of 4. Thickness of the A horizon ranges from 2 to 12 inches.

The B2t horizon has hue of 2.5YR or 5YR, value of 3 or 4, and chroma of 4, 6, or 8. Texture is silty clay or clay.

The B3 horizon has colors and texture similar to the B2 horizon.

The IIC horizon has hue of 5YR or 2.5YR, value of 4 or 5, and chroma of 6 or 8. Texture is stratified very fine sandy loam, silt loam, and silty clay loam.

Moreland series

The Moreland series consists of deep, somewhat poorly drained, very slowly permeable soils that formed in clayey alluvium on backswamps of the Arkansas River. These soils have a seasonal high water table late in winter and early in spring. Native vegetation is mixed hardwoods. Slopes are 0 to 1 percent.

Moreland soils are geographically associated with Gallion, Perry, Roxana, and Wrightsville soils. Gallion soils are on natural levees, have a fine-silty control section, and are well drained. Perry soils are on lower backswamps, do not have a mollic epipedon, and are poorly drained. Roxana soils are on higher flood plains, have a coarse-silty control section, do not have a mollic epipedon, and have vertic properties. Wrightsville soils are on flats or in depressions of streams or terraces, are grayer, and are clayey throughout.

Typical pedon of Moreland silty clay, 0 to 1 percent slopes, in a soybean field, SW1/4SW1/4NE1/4 sec. 19, T. 5 N., R. 16 W.

Ap—0 to 5 inches; dark brown (7.5YR 3/2) silty clay; moderate fine granular structure; firm; common fine roots; slightly acid; clear smooth boundary.
A12—5 to 17 inches; dark reddish brown (5YR 3/2) silty clay; moderate fine subangular blocky structure; firm; common fine roots; few fine pores; slightly acid; clear smooth boundary.
B21—17 to 30 inches; dark reddish brown (5YR 3/3) silty clay; few fine faint gray mottles; moderate medium subangular blocky structure; firm; few slickensides; few fine roots and pores; few fine black concretions; thin strata of silt loam; neutral; gradual wavy boundary.
B22—30 to 47 inches; dark reddish brown (5YR 3/4) silty clay; few fine faint gray mottles; strong angular blocky structure; firm; few slickensides; few fine black concretions; few fine carbonate concretions; slight effervescence; thin strata of silt loam; moderately alkaline; gradual wavy boundary.
B3—47 to 72 inches; reddish brown (5YR 4/4) silty clay; strong angular blocky structure; firm; distinct slickensides; many carbonate concretions; strong effervescence; moderately alkaline.

Depth to calcareous layers ranges from 10 to less than 40 inches. Reaction of the A horizon ranges from mildly alkaline to slightly acid, and reaction of the B horizon ranges from moderately alkaline to neutral. Slickensides are present within a depth of 40 inches.

The A horizon has hue of 5YR, value of 3, and chroma of 2 or 3; or it has hue of 7.5YR, value of 3, and chroma of 2. Thickness of the A horizon ranges from 10 to 22 inches.

The B horizon has hue of 5YR, value of 3 or 4, and chroma of 3 or 4; or it has hue of 2.5YR, value of 3, and chroma of 4. It has few fine faint mottles of brown and gray. Texture is silty clay or clay in the B21 and B22 horizons; it is silty clay, clay, or silty clay loam in the B3 horizon.

Mountainburg series

The Mountainburg series consists of shallow, well drained soils that have moderately rapid permeability. These soils formed in residuum from hard, massive, horizontally bedded sandstone and interbedded shales. The soils are on gently sloping to moderately steep ledges, ridgetops, and benches. Native vegetation is mixed pine and hardwoods. Slopes are 3 to 20 percent.

Mountainburg soils are geographically associated with Enders and Linker soils. Enders soils are on adjacent side slopes, have a clayey control section, and have a solum more than 20 inches thick. Linker soils are on benches and plateaus, are more than 20 inches deep to bedrock, and have a fine-loamy control section.

Typical pedon of Mountainburg stony fine sandy loam, from an area of Mountainburg-Rock outcrop complex, 3 to 20 percent slopes, SE1/4SE1/4NE1/4 sec. 21, T. 5 N., R. 19 W.

Al—0 to 2 inches; dark grayish brown (10YR 4/2) stony fine sandy loam; weak fine granular structure; very friable; many fine roots; about 25 percent by volume angular fragments of sandstone more than 1.0 foot in diameter; strongly acid; clear smooth boundary.
A2—2 to 10 inches; yellowish brown (10YR 5/4) stony fine sandy loam; weak medium granular structure; friable; many fine roots; about 15 percent by volume angular fragments of sandstone 0.25 inch to 12 inches in diameter; very strongly acid; gradual wavy boundary.
B2t—10 to 19 inches; strong brown (7.5YR 5/6) very gravelly sandy clay loam; moderate medium subangular blocky structure; friable; few fine roots; few thin patchy clay films on faces of peds; about 40 percent by volume angular fragments of sandstone 0.25 inch to 2.0 inches in diameter; very strongly acid.
R—19 to 22 inches; horizontally bedded, hard acid sandstone.

Thickness of the solum and depth to bedrock range from 12 to 20 inches. Reaction is strongly acid or very strongly acid throughout.

The A1 horizon has hue of 10YR, value of 3 or 4, and chroma of 2 or 3. The A2 horizon has hue of 10YR, value of 4 or 5, and chroma of 3 or 4. Content of coarse fragments ranges from 15 to 60 percent by volume in the A horizon. Thickness of the A horizon ranges from 4 to 13 inches.

The B2t horizon has hue of 10YR or 7.5YR, value of 5, and chroma of 6; or it has hue of 5YR, value of 4, and chroma of 8. Content of coarse fragments in the B horizon ranges from 35 to 50 percent. The underlying material is hard, massive, sandstone bedrock.

Muskogee series

The Muskogee series consists of deep, moderately well drained, slowly permeable soils that formed in thin loamy material over clayey alluvium. Native vegetation is mixed hardwoods. Slopes are 1 to 8 percent.

Muskogee soils are geographically associated with Allen, Leadvale, McKamie, and Wrightsville soils. Allen soils are on higher stream terraces, have a fine-loamy control section, and are well drained. Leadvale soils are on higher terraces and have a fragipan. McKamie soils are on higher terraces, have a fine control section, and do not have mottles of low chroma in the upper part of the B horizon. Wrightsville soils are on lower terraces, have a fine control section, and are poorly drained.

Typical pedon of Muskogee silt loam, 1 to 3 percent slopes, in a pasture, NE1/4SE1/4SW1/4 sec. 11, T. 5 N., R. 15 W.

Ap—0 to 5 inches; brown (10YR 4/3) silt loam; weak medium granular structure; friable; many fine roots; strongly acid; clear smooth boundary.

A2—5 to 10 inches; yellowish brown (10YR 5/4) silt loam; few medium faint pale brown (10YR 6/3) mottles; weak medium granular structure; very friable; many fine roots; few fine pores; strongly acid; clear smooth boundary.
B1—10 to 20 inches; yellowish brown (10YR 5/6) silty clay loam; few fine distinct pale brown mottles; weak medium subangular blocky structure; friable; few fine roots and pores; very strongly acid; gradual wavy boundary.
B21t—20 to 29 inches; yellowish brown (10YR 5/6) silty clay loam; common medium distinct light brownish gray (10YR 6/2) and grayish brown (10YR 5/2) mottles; moderate medium subangular blocky structure; friable; many thin patchy clay films on faces of peds; few fine roots and pores; few black concretions; strongly acid; gradual smooth boundary.
B22t—29 to 50 inches; mottled light brownish gray (10YR 6/2), yellowish red (5YR 5/6), and red (2.5YR 4/6) silty clay; moderate medium subangular blocky structure; firm, sticky; many thin patchy clay films on faces of peds; few fine roots and pores; strongly acid; gradual wavy boundary.
B23t—50 to 73 inches; red (2.5YR 4/6) clay; moderate medium subangular blocky structure; very firm; sticky; common thin patchy clay films on faces of peds; medium acid.

Thickness of the solum is more than 60 inches. Reaction of the A, B1, and B21t horizons ranges from medium acid to very strongly acid, and the B22t and B23t horizons are medium acid or strongly acid.

The Ap horizon has hue of 10YR, value of 4 or 5, and chroma of 2 or 3. The A2 horizon has hue of 10YR, value of 5 or 6, and chroma of 2, 3, or 4. Thickness of the A horizon ranges from 4 to 13 inches.

The B1 horizon has hue of 10YR, value of 5 or 6, and chroma of 4 or 6. Texture is silt loam or silty clay loam.

The B21t horizon has hue of 10YR, value of 5, and chroma of 6 or 8; or it has hue of 7.5YR, value of 5, and chroma of 6 or 8. It is mottled in shades of brown and gray. Texture is silty clay loam or silt loam.

The B22t and B23t horizons have hue of 5YR and 2.5YR, value of 4, and chroma of 6; hue of 5YR, value of 5, and chroma of 6; or hue of 10YR, value of 6, and chroma of 1 or 2. Texture is silty clay or clay. In some pedons red is the matrix color. Other pedons are mottled but have no matrix color.

Perry series

The Perry series consists of deep, poorly drained, very slowly permeable soils that formed in clayey alluvium in low backswamps. These soils are wet for long periods late in winter and early in spring. They flood for brief periods during this time. Native vegetation is mixed hardwoods. Slopes are less than 1 percent.

Perry soils are geographically associated with Gallion, Moreland, Roxana, and Wrightsville soils. Gallion soils are in higher positions on the landscape, have a fine-silty control section, and are well drained. Moreland soils are on higher backswamp areas, have a mollic epipedon, and are somewhat poorly drained. Roxana soils are on level flood plains of the Arkansas River, have a coarse-silty control section, and are well drained. Wrightsville soils are on lower adjacent depressional terraces, have tonguing through the B horizon, and have a fine control section.

Typical pedon of Perry clay, occasionally flooded, in a rice field, SE1/4NE1/4NW1/4 sec. 15, T. 4 N., R. 16 W.

Ap—0 to 6 inches; dark grayish brown (10YR 4/2) clay; few fine faint strong brown mottles; weak medium subangular blocky structure; friable; many fine roots; medium acid; abrupt smooth boundary.
B21g—6 to 16 inches; gray (10YR 5/1) clay; few fine faint strong brown mottles; moderate medium subangular blocky structure; very firm; few slickensides; few fine roots; medium acid; clear smooth boundary.
B22g—16 to 24 inches; dark gray (10YR 4/1) clay; few medium distinct strong brown (7.5YR 5/8) mottles; moderate medium subangular blocky structure; very firm; few slickensides; few fine roots; few fine faint lime concretions; neutral; clear smooth boundary.
IIB3—24 to 40 inches; dark reddish brown (5YR 3/4) clay; few fine distinct red mottles; moderate medium subangular blocky structure; firm; common slickensides; few small lime concretions; moderately alkaline; clear smooth boundary.
IIC—40 to 72 inches; reddish brown (5YR 4/4) clay; moderate medium subangular blocky structure; firm; few fine carbonate concretions; moderately alkaline.

Thickness of the solum ranges from 30 to 60 inches. Depth to the IIB horizon ranges from 16 to 36 inches. Reaction of the A horizon ranges from medium acid to very strongly acid. The B2g horizon ranges from neutral to strongly acid. Reaction of the IIB and IIC horizons ranges from moderately alkaline to slightly acid.

The A horizon has hue of 10YR, value of 4 or 5, and chroma of 1 or 2. Thickness of the A horizon ranges from 4 to 9 inches.

The B2g horizon has hue of 10YR, value of 4 or 5, and chroma of 1. It has mottles in shades of brown.

The IIB3 and IIC horizons have hue of 5YR, value of 3 or 4, and chroma of 3 or 4.

Pirum series

The Pirum series consists of moderately deep or deep, well drained, moderately permeable soils. These soils formed in loamy colluvial material and residuum over tilted and fractured shale and sandstone. The soils are in colluvial positions on the Ouachita Mountains. Native vegetation is mixed hardwoods and pines. Slopes are 3 to 45 percent.

Pirum soils are geographically associated with Carnasaw, Ceda, Clebit, and Sherwood soils. Carnasaw soils are on adjacent uplands, have a clayey control section, and have slow permeability. Ceda soils are on narrow flood plains, have a loamy-skeletal control section, and have rapid permeability. Clebit soils are on ridgetops and upper side slopes, have a loamy-skeletal control section, and have a solum that is less than 20 inches thick. Sherwood soils are on ridgetops and upper side slopes on uplands, have a B horizon redder than 7.5YR hue, and have mixed mineralogy.

Typical pedon of Pirum fine sandy loam, from an area of Carnasaw-Pirum association, undulating, SW1/4SE1/4NW1/4 sec. 28, T. 3 N., R. 18 W.

A1—0 to 6 inches; dark brown (10YR 4/3) fine sandy loam; weak fine granular structure; many fine roots; very friable; about 10 percent by volume fragments of sandstone 0.25 to 1 inch in diameter; strongly acid; clear smooth boundary.

A2—6 to 13 inches; yellowish brown (10YR 5/4) fine sandy loam; weak fine granular structure; many fine roots; friable; about 10 percent by volume fragments of sandstone 0.25 to 1 inch in diameter; strongly acid; gradual wavy boundary.

B21t—13 to 26 inches; yellowish brown (10YR 5/6) sandy clay loam; moderate medium subangular blocky structure; few thin patchy clay films on faces of peds; few fine roots and pores; very strongly acid; gradual wavy boundary.

B22t—26 to 36 inches; strong brown (7.5YR 5/6) sandy clay loam; moderate medium subangular blocky structure; few thin patchy clay films on faces of peds; few fine roots and pores; very strongly acid; abrupt irregular boundary.

R—36 to 42 inches; the underlying bedrock is yellowish red, fractured and tilted sandstone, extending to a depth of 42 inches or more.

Thickness of the solum and depth to bedrock range from 22 to 50 inches. Reaction is strongly acid or very strongly acid throughout. Sandstone or shale fragments range from 1 inch to 12 inches in diameter and make up 0 to 30 percent by volume of the A and B horizons.

The A1 horizon has hue of 10YR, value of 4, and chroma of 3 or 4; or it has hue of 10YR, value of 5, and chroma of 3 or 4. The A2 horizon has hue of 10YR, value of 5 or 6, and chroma of 3 or 4. Texture of the A horizon is fine sandy loam, gravelly fine sandy loam, and stony fine sandy loam.

The B horizon has hue of 10YR, value of 5 or 6, and chroma of 6 or 8; or it has hue of 7.5YR, value of 5, and chroma of 6 or 8. Texture of the B horizon is sandy clay loam or loam.

Roxana series

The Roxana series consists of deep, well drained, moderately permeable soils that formed in stratified, loamy alluvium on level to nearly level flood plains of the Arkansas River. Native vegetation is pecan, cottonwood, and willow. Slopes are 0 to 3 percent.

Roxana soils are geographically associated with Gallion, Moreland, and Perry soils. Gallion soils are on slightly higher flood plains and have a fine-silty control section. Moreland soils are in backswamp areas, have a mollic epipedon, have a fine control section, and have vertic properties. Perry soils are on backswamps, have a very fine control section, and are poorly drained.

Typical pedon of Roxana very fine sandy loam, 0 to 1 percent slopes, in a soybean field, NE1/4SE1/4NW1/4 sec. 13, T. 5 N., R. 15 W.

Ap—0 to 6 inches; reddish brown (5YR 4/4) very fine sandy loam; weak fine granular structure; friable; many fine roots; neutral; abrupt smooth boundary.

C1—6 to 22 inches; yellowish red (5YR 4/6) very fine sandy loam; massive; friable; few thin bedding planes; common fine roots; neutral; clear smooth boundary.

C2—22 to 31 inches; dark brown (7.5YR 4/4) very fine sandy loam; massive; friable; common thin bedding planes; common fine roots; strata of loamy fine sand 1 inch or 2 inches thick; moderately alkaline; clear smooth boundary.

C3—31 to 58 inches; brown (7.5YR 5/4) very fine sandy loam; massive; friable; few thin bedding planes; few fine roots; strata of loamy fine sand 1 inch or 2 inches thick; moderately alkaline; abrupt smooth boundary.

C4—58 to 66 inches; strong brown (7.5YR 5/6) very fine sandy loam; massive; friable; few faint roots; moderately alkaline; clear smooth boundary.

C5—66 to 72 inches; strong brown (7.5YR 5/6) very fine sandy loam; massive; very friable; moderately alkaline.

Bedding planes are evident in the 10- to 40-inch control section. Reaction is neutral or slightly acid in the A horizon and ranges from moderately alkaline to neutral in the C horizon.

The A horizon ranges from 3 to 6 inches in thickness. It has hue of 5YR, value of 3 or 4, and chroma of 4.

The C horizon is stratified and has hue of 5YR, value of 4 or 5, and chroma of 6 or 8; or it has hue of 7.5YR, value of 4 or 5, and chroma of 4; or hue of 7.5YR, value of 5, and chroma of 6 or 8. Texture is very fine sandy loam, silt loam, or loamy very fine sand. Some pedons have a buried A horizon at a depth of 40 inches or more.

Sherwood series

The Sherwood series consists of moderately deep or deep, well drained, moderately permeable soils that formed in material weathered from sandstone. These soils are on lower ridgetops and side slopes of mountains and high terraces in the valleys of mountains.

Native vegetation is mixed hardwoods and shortleaf pine. Slopes are 3 to 8 percent.

Sherwood soils are geographically associated with Carnasaw, Leadvale, and Pirum soils. Carnasaw soils are on adjacent uplands, have a clayey control section, and have slow permeability. Leadvale soils are on adjacent terraces, are moderately well drained, and have a fragipan. Pirum soils are on lower colluvial side slopes and hillsides, have a B horizon with hue of 7.5YR or yellower, and have siliceous mineralogy.

Typical pedon of Sherwood fine sandy loam, 3 to 8 percent slopes, in a pasture, NE1/4NE1/4SW1/4 sec. 25, T. 4 N., R. 17 W.

Ap—0 to 7 inches; dark brown (10YR 4/3) fine sandy loam; weak fine granular structure; friable; common fine roots; medium acid; clear smooth boundary.

A2—7 to 16 inches; yellowish brown (10YR 5/4) fine sandy loam; weak fine granular structure; friable; common fine roots; strongly acid; clear smooth boundary.

B21t—16 to 28 inches; yellowish red (5YR 5/8) gravelly clay loam; weak medium subangular blocky structure; many thin patchy clay films on faces of peds; friable; few fine roots and pores; 15 percent by volume fragments of sandstone and shale 0.25 inch to 3 inches in diameter; strongly acid; gradual wavy boundary.

B22t—28 to 36 inches; yellowish red (5YR 5/8) gravelly clay loam; common medium distinct red (2.5YR 4/6) mottles; weak medium subangular blocky structure; many thin patchy clay films on faces of peds; friable; few fine roots and pores; about 25 percent by volume of fragments of sandstone and shale 0.25 inch to 3 inches in diameter; very strongly acid; gradual wavy boundary.

B3—36 to 43 inches; red (2.5YR 4/6) gravelly clay loam; common medium distinct strong brown (7.5YR 5/6) and few fine faint reddish yellow mottles; moderate medium subangular blocky structure; firm; about 25 percent by volume fragments of sandstone and shale 0.5 inch to 3 inches in diameter; very strongly acid.

R—43 to 48 inches; tilted sandstone and shale.

Thickness of the solum and depth to bedrock range from 30 to 60 inches. Reaction in the A horizon ranges from medium acid to very strongly acid, and it is strongly acid or very strongly acid in the subsoil.

The Ap horizon has hue of 10YR or 7.5YR, value of 3 or 4, and chroma of 2 or 3. The A2 horizon has hue of 7.5YR or 10YR, value of 5 or 6, and chroma of 3 or 4. Thickness of the A horizon ranges from 7 to 19 inches.

The B1 horizon, if present, has hue of 5YR or 7.5YR, value of 5, and chroma of 4, 6, or 8. Texture is loam, clay loam, or the gravelly counterparts. Fragments of rock less than 3 inches in diameter range from 2 to 20 percent by volume.

The B2t horizon has hue of 2.5YR or 5YR, value of 4 or 5, and chroma of 4, 6, or 8. Texture is clay loam or sandy clay loam. Gravelly texture is recognized. Fragments of rock less than 3 inches in diameter range from 5 to 20 percent by volume in the B21t horizon and from 15 to 35 percent by volume in the B22t horizon.

The B3 horizon has a range in color and texture similar to the B2t horizon. Fragments of rock more than 3.0 inches in diameter range from 5 to 15 percent by volume, and rock fragments less than 3.0 inches in diameter range from 15 to 45 percent by volume.

Spadra series

The Spadra series consists of deep, well drained, moderately permeable soils that formed in loamy alluvial material weathered from sandstone, siltstone, and shale. These soils are on level and nearly level stream terraces. Native vegetation is mixed hardwoods and shortleaf pine. Slopes are 0 to 2 percent.

Spadra soils are geographically associated with Barling and Guthrie soils. Barling soils are on flood plains, are moderately well drained, and have a coarse-silty control section. Guthrie soils are in depressions on terraces, have a fine-silty control section, and have a fragipan.

Typical pedon of Spadra fine sandy loam, 0 to 2 percent slopes, in a pasture, NW1/4NE1/4NW1/4 sec. 33, T. 4 N., R. 19 W.

Ap—0 to 7 inches; dark brown (10YR 4/3) fine sandy loam; weak fine granular structure; friable; common fine roots; medium acid; abrupt smooth boundary.

B2t—7 to 30 inches; brown (7.5YR 4/4) loam; weak medium subangular blocky structure; friable; common thin patchy clay films on faces of peds; common fine roots; few fine pores; strongly acid; gradual smooth boundary.

B3—30 to 59 inches; brown (7.5YR 4/4) sandy loam; weak medium subangular blocky structure; very friable; few fine roots and pores; very strongly acid; gradual wavy boundary.

C—59 to 72 inches; brown (7.5YR 4/4) fine sandy loam; massive; friable; very strongly acid.

Thickness of the solum ranges from 40 to 60 inches. Reaction of the soil ranges from medium acid to very strongly acid throughout.

The A horizon has hue of 10YR, value of 3 or 4, and chroma of 4; or hue of 10YR, value of 4, and chroma of 3. Thickness of the A horizon ranges from 5 to 10 inches.

The B2t horizon has hue of 7.5YR, value of 4, and chroma of 4; or it has hue of 5YR, value of 4 or 5, and chroma of 4 or 6. Texture is loam or sandy clay loam.

The B3 and C horizons have hue of 7.5YR or 5YR, value of 4, and chroma of 4. Texture is loam, sandy loam, or fine sandy loam.

Taft series

The Taft series consists of deep, somewhat poorly drained, slowly permeable soils that formed in loamy material derived from weathered shale and siltstone. These soils are on stream terraces and in depressions. The soils have a perched water table late in winter and early in spring. Native vegetation is mixed hardwoods. Slopes are 0 to 1 percent.

Taft soils are geographically associated with Barling and Leadvale soils. Barling soils are on flood plains, are moderately well drained, and do not have a fragipan. Leadvale soils are on higher terraces, have an argillic horizon above the fragipan, and are moderately well drained.

Typical pedon of Taft silt loam, 0 to 1 percent slopes, in a bermudagrass field, NE1/4NW1/4SW1/4 sec. 25, T. 5 N., R. 18 W.

Ap—0 to 5 inches; dark grayish brown (10YR 4/2) silt loam; weak fine granular structure; very friable; many fine and medium roots; strongly acid; clear smooth boundary.

A2—5 to 11 inches; pale brown (10YR 6/3) silt loam; few fine faint brown and yellowish brown mottles; weak medium granular structure; very friable; many fine roots; strongly acid; gradual wavy boundary.

B2—11 to 22 inches; pale brown (10YR 6/3) silty clay loam; common medium distinct light brownish gray (10YR 6/2) and yellowish brown (10YR 5/6) mottles; weak medium subangular blocky structure; friable; many fine roots; strongly acid; gradual wavy boundary.

A'2&Bx1—22 to 40 inches; mottled light gray (10YR 7/1) and yellowish brown (10YR 5/6) silty clay loam; weak thick platy structure parting to moderate medium subangular blocky; compact and brittle; firm; few thin patchy clay films on faces of peds; few fine roots and pores; very strongly acid; gradual wavy boundary.

Bx2—40 to 60 inches; yellowish brown (10YR 5/4) silty clay loam; many common distinct light gray (10YR 7/1) mottles; weak thick platy structure parting to moderate medium subangular blocky; compact and brittle; firm; common thin patchy clay films on faces of peds; vertical veins of gray silty clay 0.5 inch in diameter; few fine roots; very strongly acid; gradual wavy boundary.

B'2t—60 to 76 inches; yellowish brown (10YR 5/6) silty clay loam; many medium distinct light gray (10YR 7/1) mottles; moderate medium subangular blocky structure; firm; many vertical gray clay veins; continuous clay films on faces of peds; very strongly acid.

Thickness of the solum is 50 inches or more. Depth to the fragipan ranges from 20 to 36 inches. Reaction is strongly acid or very strongly acid throughout.

The A horizon has hue of 10YR, value of 5 or 6, and chroma of 3; or hue of 10YR, value of 4, and chroma of 2. Thickness of the A horizon ranges from 5 to 17 inches.

The B2 horizon has hue of 10YR, value of 5 or 6, and chroma of 3 or 4. Texture is silt loam or silty clay loam. Mottles that have chroma of 1 or 2 are within a depth of 10 inches of the B horizon.

The Bx horizon has hue of 10YR, value of 5, and chroma of 4 or 6; or it is evenly mottled in shades of brown and gray. Texture is silt loam or silty clay loam.

The B2t horizon has hue of 10YR, value of 5, and chroma of 6; or it is mottled in shades of gray, red, and brown. Texture is silty clay loam or loam.

Wrightsville series

The Wrightsville series consists of deep, poorly drained, very slowly permeable soils that formed in old clayey alluvium with a loamy mantle. These soils are on flats or in depressions of streams or terraces. They have a perched water table late in winter and early in spring. Slopes are dominantly less than 1 percent.

Wrightsville soils are geographically associated with Allen, Moreland, Muskogee, and Perry soils. Allen soils are on higher stream terraces, have a fine-loamy control section, and are well drained. Moreland soils are on slightly higher flood plains, are clayey throughout, and are not as gray. Muskogee soils are on higher terraces, have a fine-silty control section, and are moderately well drained. Perry soils are on lower backswamps near the Arkansas River and its tributaries, do not have tonguing through the B horizon, and have a very-fine control section.

Typical pedon of Wrightsville silt loam, 0 to 1 percent slopes, in a wooded area, SW1/4SW1/4SW1/4, sec. 9, T. 4 N., R. 16 W.

O1—1 inch to 0; hardwood leaves.

A1—0 to 3 inches; grayish brown (10YR 5/2) silt loam; weak fine granular structure; friable; common medium roots; strongly acid; abrupt smooth boundary.

A2g—3 to 18 inches; gray (10YR 6/1) silt loam; common medium distinct strong brown (7.5YR 5/6) mottles; weak medium granular structure; friable; common fine roots; strongly acid; abrupt smooth boundary.

Bg&Ag—18 to 32 inches; gray (10YR 6/1) silty clay loam; 10 percent tongues 0.5 to 1 inch wide of light gray (10YR 7/1) silt loam; common medium distinct strong brown (7.5YR 5/6) and dark yellowish brown (10YR 4/4) mottles; weak medium prismatic structure parting to weak medium subangular blocky; friable; few thin patchy clay films on faces of peds; few fine roots; common fine pores; strongly acid; gradual wavy boundary.

B21tg—32 to 44 inches; gray (10YR 5/1) silty clay; common medium distinct yellowish brown (10YR

5/6) mottles; weak medium prismatic structure parting to moderate medium subangular blocky; firm; many thin patchy clay films on faces of peds; few fine roots; common fine pores; 5 percent tongues 0.4 to 1 inch wide with interfingering of light gray silt; very strongly acid; gradual wavy boundary.

B22tg—44 to 51 inches; grayish brown (10YR 5/2) silty clay; common medium distinct gray (10YR 5/1) mottles; weak medium prismatic structure parting to moderate medium subangular blocky; firm; thin patchy clay films on faces of peds; few fine roots and pores; very strongly acid; gradual wavy boundary.

B23tg—51 to 72 inches; gray (10YR 5/1) silty clay; common medium distinct yellowish brown (10YR 5/6) and brown (7.5YR 5/4) mottles; moderate medium subangular blocky structure; firm; thin patchy clay films on faces of peds; few small black concretions; very strongly acid.

Thickness of the solum ranges from 40 to more than 72 inches. Reaction is strongly acid or very strongly acid throughout.

The A horizon ranges from 10 to 24 inches in thickness. The A1 horizon has hue of 10YR; value of 3, 4, or 5; and chroma of 2. The A2 horizon has hue of 10YR, value of 6 or 7, and chroma of 1 or 2.

The B2tg horizon has hue of 10YR; value of 5, 6, or 7; and chroma of 1 or 2. Texture is silty clay loam, silty clay, or clay with tongues of silt loam.

The Cg horizon, if present, has a range in color and texture similar to the B2tg horizon. Some pedons have a IIC horizon that is reddish clay or silty clay.

formation of the soils

In this section, the factors of soil formation are discussed and related to the soils in the survey area. In addition, the processes of soil formation are described.

factors of soil formation

Soil is a natural, three-dimensional body on the earth's surface that supports plants and has properties resulting from the integrated effects of climate and living matter acting on earthy parent material, as conditioned by relief over periods of time (*4*).

The interaction of five main factors results in differences among soils. These factors are physical and chemical composition of the parent material; climate during and after the accumulation of the parent material; the kind of plants and organisms living in the soil; the relief of the land and its effects on runoff; and the interaction of time on all the other factors.

The effect of one factor can differ from place to place, but the interaction of all the factors determines the kind of soil that forms. In the following paragraphs, the factors of soil formation are discussed as they relate to the soils in the survey area.

parent material

The soils of Perry County formed in alluvium and residuum from materials weathered from shale and sandstone bedrock.

The alluvium was deposited by the Arkansas River and its tributaries. It consists of a mixture of minerals transported from several states and weathered from several types of rocks. Many of the minerals in the Arkansas River alluvium are only partially weathered. As a result, they are high in natural fertility. Here, such soils as the Gallion and Roxana soils formed.

The Roxana soils formed in loamy sediment deposited along or near the river on natural levees. The Moreland and Perry soils formed in predominantly clayey sediment deposited by slack water on flats and flood bays at places farther from the river. Most of the minerals in the alluvium from tributary streams are highly weathered and low to moderate in natural fertility. Here, such soils as the Barling and Spadra soils formed.

As the weathering bedrock is protected from erosion, the residuum accumulates and soils form in this parent material. The soils that formed in residuum have properties directly related to the characteristics of the parent bedrock. Sandstone bedrock weathers into loamy material with coarse fragments of resistant minerals. Here, such soils as the Sherwood and Pirum soils formed. Shale bedrock weathers into clayey material with a few fragments of resistant minerals. Here, such soils as the Carnasaw soils formed.

climate

The climate of Perry County is characterized by mild winters, warm or hot summers, and generally adequate rainfall. The generally warm temperatures and high precipitation are probably similar to the climate under which the soils in the county formed. The average daily temperature in Perry County is about 59.8°F. The total annual rainfall is about 46 inches and is well distributed throughout the year. For additional information about the climate, refer to the section "General nature of the county."

The warm, moist climate promotes rapid soil formation, and the warm temperature encourages rapid chemical reactions. The large amount of water that moves through the soil is instrumental in removing dissolved or suspended materials. Because remains of plants decompose rapidly, the organic acids thus formed hasten the formation of clay minerals and the removal of carbonates. Because the soil is frozen to shallow depths for short periods, soil formation continues almost year-round. The climate throughout the county is uniform, although its effect is modified locally by runoff. Climate alone does not account for differences in the soils of Perry County.

living organisms

The higher plants and animals, as well as insects, bacteria, and fungi, are important in the formation of soils. Among the changes they cause are gains and losses in organic matter and nitrogen in the soils, gains or losses in plant nutrients, and changes in structure and porosity.

Before Perry County was settled, the native vegetation probably had more influence on soil formation than did animal activity. Hardwood and pine forests covered the county. Differences in native vegetation seem to have been related mainly to variations in drainage and, to a lesser degree, parent material. Because the type of vegetation is relatively uniform throughout the county, differences among the soils cannot be directly related to vegetation

Man is important to the present and future rate and direction of soil formation. He clears the forest, cultivates the soil, and introduces new kinds of plants. He adds fertilizer and lime and chemicals for insect, disease, and weed control. He improves drainage and grades the soil surface. The results of these changes may not be evident for centuries. Nevertheless, man has drastically changed the complex of living organisms affecting soil formation in Perry County. Thus, man has become the most important organism affecting soil formation.

relief

Relief is the inequalities in elevation of a land surface. The other soil-forming factors are affected by relief through its effect on drainage, runoff, erosion, and percolation of water through the soil. Some of the greatest differences among the soils are mainly attributed to differences in relief.

The bottom land area of Perry County has relief ranging from level backswamps to undulating ridges and swales. Local differences in relief are generally less than 1 foot on the backswamps and 3 to 4 feet on the ridges and swales.

The upland area of Perry County has relief ranging from broad, gently sloping valleys to very steep ridges. Overall relief of the uplands is a series of nearly parallel and generally north-south trending, gently sloping valleys and strongly sloping to steep, nearly parallel ridges.

time

The length of time required for the formation of a soil largely depends upon other factors of soil formation. Less time generally is required if the climate is warm and humid and the vegetation is luxuriant. If other factors are equal, less time also is required where the parent material is sandy or loamy than where it is clayey.

In terms of geologic time, the soils of Perry County are both young and old. The soils of the Arkansas River bottom lands, such as the Gallion and Roxana soils, are young. It is estimated that these soils are between 10,000 and 20,000 years old. Carnasaw and Sherwood soils are old soils of the uplands. It is estimated that these soils are more than 1,000,000 years old. The degree of soil development is a good indicator of the age of a soil. Roxana soils have been in place so short a time that the soils show little evidence of development and horizonation. Carnasaw soils formed in residuum and are strongly developed with distinct horizons.

processes of soil formation

This subsection gives a brief definition of the horizon nomenclature and processes responsible for soil formation.

The marks that soil-forming factors leave on the soil are recorded in the soil profile by the succession of layers or horizons from the surface to the parent material. The horizons differ in one or more properties, such as color, texture, structure, consistence, porosity, and reaction. Most soil profiles contain three major horizons, called the A, B, and C horizons. Very young soils do not have a B horizon.

The A1 horizon, or surface layer, is the horizon of maximum accumulation of organic matter. The A2 horizon is the horizon of maximum leaching of dissolved or suspended materials.

The B horizon lies immediately beneath the A horizon and is sometimes called the subsoil. It is the horizon of maximum accumulation of dissolved or suspended materials, such as iron and clay. Commonly, the B horizon has blocky structure and is firmer than the horizons immediately above and below (*10*).

Beneath the B horizon is the C horizon, which has been affected little by the soil-forming processes; however, the C horizon can be materially modified by weathering. In some young soils, the C horizon immediately underlies the A horizon and has been slightly modified by living organisms, as well as by weathering.

Several processes have been active in the formation of soil horizons in the soils of Perry County. Among these processes are the accumulation of organic matter, leaching of calcium carbonates and bases, reduction and transfer of iron, and formation and translocation of silicate clay minerals. In most of the soils of Perry County, more than one of these processes have been active in soil formation.

The accumulation of organic matter in the upper part of the profile to form an A1 horizon has been an important process of soil formation. The soils of Perry County range from high to low in content of organic matter.

Leaching of carbonates and bases has occurred to some extent in nearly all of the soils of Perry County. Among soil scientists, it is generally accepted that bases are leached downward in soils before silicate clay minerals begin to move. Some of the soils are only slightly leached, but most of the soils in Perry County are highly leached.

Reduction and transfer of iron has occurred, to a significant extent, in the somewhat poorly drained and poorly drained soils. In naturally wet soils, this process is called gleying. Gray colors in the layers below the surface indicate the reduction and loss of iron. Some horizons contain reddish or yellowish mottles and concretions derived from segregated iron. Gleying is pronounced in several of the soils. Among the gleyed soils are Guthrie, Perry, and Wrightsville soils.

In several soils in Perry County, the translocation of clay minerals has contributed to the formation of horizons. In some places, the eluviated A2 horizon has been destroyed by cultivation. In areas where an A2 horizon is present, structure is granular to platy, clay content is less than in the lower horizons, and the horizon is lighter in color. Generally, clay films have

accumulated in pores and on surfaces of peds in the B horizon. The soils were probably leached of carbonates and soluble salts to a great extent before translocation of silicate clay occurred.

Leaching of bases and translocation of silicate clay are among the most important processes in horizon differentiation in the soils of Perry County.

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glossary

ABC soil. A soil having an A, a B, and a C horizon.

AC soil. A soil having only an A and a C horizon. Commonly such soil formed in recent alluvium or on steep rocky slopes.

Aeration, soil. The exchange of air in soil with air from the atmosphere. The air in a well aerated soil is similar to that in the atmosphere; the air in a poorly aerated soil is considerably higher in carbon dioxide and lower in oxygen.

Aggregate, soil. Many fine particles held in a single mass or cluster. Natural soil aggregates, such as granules, blocks, or prisms, are called peds. Clods are aggregates produced by tillage or logging.

Alluvium. Material, such as sand, silt, or clay, deposited on land by streams.

Area reclaim (in tables). An area difficult to reclaim after the removal of soil for construction and other uses. Revegetation and erosion control are extremely difficult.

Association, soil. A group of soils geographically associated in a characteristic repeating pattern and defined and delineated as a single map unit.

Available water capacity (available moisture capacity). The capacity of soils to hold water available for use by most plants. It is commonly defined as the difference between the amount of soil water at field moisture capacity and the amount at wilting point. It is commonly expressed as inches of water per inch of soil. The capacity, in inches, in a 60-inch profile or to a limiting layer is expressed as—

	Inches
Very low	0 to 3
Low	3 to 6
Moderate	6 to 9
High	9 to 12
Very high	More than 12

Base saturation. The degree to which material having cation exchange properties is saturated with exchangeable bases (sum of Ca, Mg, Na, K), expressed as a percentage of the total cation exchange capacity.

Bedding planes. Fine stratifications, less than 5 millimeters thick, in unconsolidated alluvial, eolian, lacustrine, or marine sediments.

Bedrock. The solid rock that underlies the soil and other unconsolidated material or that is exposed at the surface.

Bottom land. The normal flood plain of a stream, subject to flooding.

Calcareous soil. A soil containing enough calcium carbonate (commonly combined with magnesium carbonate) to effervesce visibly when treated with cold, dilute hydrochloric acid.

Cation. An ion carrying a positive charge of electricity. The common soil cations are calcium, potassium, magnesium, sodium, and hydrogen.

Cation-exchange capacity. The total amount of exchangeable cations that can be held by the soil, expressed in terms of milliequivalents per 100 grams of soil at neutrality (pH 7.0) or at some other stated pH value. The term, as applied to soils, is synonymous with base-exchange capacity, but is more precise in meaning.

Clay. As a soil separate, the mineral soil particles less than 0.002 millimeter in diameter. As a soil textural class, soil material that is 40 percent or more clay, less than 45 percent sand, and less than 40 percent silt.

Clay film. A thin coating of oriented clay on the surface of a soil aggregate or lining pores or root channels. Synonyms: clay coating, clay skin.

Claypan. A slowly permeable soil horizon that contains much more clay than the horizons above it. A claypan is commonly hard when dry and plastic or stiff when wet.

Coarse fragments. If round, mineral or rock particles 2 millimeters to 25 centimeters (10 inches) in diameter; if flat, mineral or rock particles (flagstone) 15.2 to 38.1 centimeters (6 to 15 inches) long.

Coarse textured soil. Sand or loamy sand.

Colluvium. Soil material, rock fragments, or both moved by creep, slide, or local wash and deposited at the base of steep slopes.

Complex slope. Irregular or variable slope. Planning or constructing terraces, diversions, and other water-control measures on a complex slope is difficult.

Concretions. Grains, pellets, or nodules of various sizes, shapes, and colors consisting of concentrated compounds or cemented soil grains. The composition of most concretions is unlike that of the surrounding soil. Calcium carbonate and iron oxide are common compounds in concretions.

Consistence, soil. The feel of the soil and the ease with which a lump can be crushed by the fingers. Terms commonly used to describe consistence are—

Loose.—Noncoherent when dry or moist; does not hold together in a mass.
Friable.—When moist, crushes easily under gentle pressure between thumb and forefinger and can be pressed together into a lump.
Firm.—When moist, crushes under moderate pressure between thumb and forefinger, but resistance is distinctly noticeable.
Plastic.—When wet, readily deformed by moderate pressure but can be pressed into a lump; will form a "wire" when rolled between thumb and forefinger.
Sticky.—When wet, adheres to other material and tends to stretch somewhat and pull apart rather than to pull free from other material.
Hard.—When dry, moderately resistant to pressure; can be broken with difficulty between thumb and forefinger.
Soft.—When dry, breaks into powder or individual grains under very slight pressure.
Cemented.—Hard; little affected by moistening.

Control section. The part of the soil on which classification is based. The thickness varies among different kinds of soil, but for many it is that part of the soil profile between depths of 10 inches and 40 or 80 inches.

Corrosive. High risk of corrosion to uncoated steel or deterioration of concrete.

Cover crop. A close-growing crop grown primarily to improve and protect the soil between periods of regular crop production, or a crop grown between trees and vines in orchards and vineyards.

Cutbanks cave (in tables). The walls of excavations tend to cave in or slough.

Depth to rock (in tables). Bedrock is too near the surface for the specified use.

Drainage class (natural). Refers to the frequency and duration of periods of saturation or partial saturation during soil formation, as opposed to altered drainage, which is commonly the result of artificial drainage or irrigation but may be caused by the sudden deepening of channels or the blocking of drainage outlets. Seven classes of natural soil drainage are recognized:
Excessively drained.—Water is removed from the soil very rapidly. Excessively drained soils are commonly very coarse textured, rocky, or shallow. Some are steep. All are free of the mottling related to wetness.
Somewhat excessively drained.—Water is removed from the soil rapidly. Many somewhat excessively drained soils are sandy and rapidly pervious. Some are shallow. Some are so steep that much of the water they receive is lost as runoff. All are free of the mottling related to wetness.
Well drained.—Water is removed from the soil readily, but not rapidly. It is available to plants throughout most of the growing season, and wetness does not inhibit growth of roots for significant periods during most growing seasons. Well drained soils are commonly medium textured. They are mainly free of mottling.
Moderately well drained.—Water is removed from the soil somewhat slowly during some periods. Moderately well drained soils are wet for only a short time during the growing season, but periodically they are wet long enough that most mesophytic crops are affected. They commonly have a slowly pervious layer within or directly below the solum, or periodically receive high rainfall, or both.
Somewhat poorly drained.—Water is removed slowly enough that the soil is wet for significant periods during the growing season. Wetness markedly restricts the growth of mesophytic crops unless artificial drainage is provided. Somewhat poorly drained soils commonly have a slowly pervious layer, a high water table, additional water from seepage, nearly continuous rainfall, or a combination of these.
Poorly drained.—Water is removed so slowly that the soil is saturated periodically during the growing season or remains wet for long periods. Free water is commonly at or near the surface for long enough during the growing season that most mesophytic crops cannot be grown unless the soil is artificially drained. The soil is not continuously saturated in layers directly below plow depth. Poor drainage results from a high water table, a slowly pervious layer within the profile, seepage, nearly continuous rainfall, or a combination of these.
Very poorly drained.—Water is removed from the soil so slowly that free water remains at or on the surface during most of the growing season. Unless the soil is artificially drained, most mesophytic crops cannot be grown. Very poorly drained soils are commonly level or depressed and are frequently ponded. Yet, where rainfall is high and nearly continuous, they can have moderate or high slope gradients.

Drainage, surface. Runoff, or surface flow of water, from an area.

Eluviation. The movement of material in true solution or colloidal suspension from one place to another within the soil. Soil horizons that have lost material through eluviation are eluvial; those that have received material are illuvial.

Eolian soil material. Earthy parent material accumulated through wind action; commonly refers to sandy material in dunes or to loess in blankets on the surface.

Erosion. The wearing away of the land surface by water, wind, ice, or other geologic agents and by such processes as gravitational creep.
Erosion (geologic). Erosion caused by geologic processes acting over long geologic periods and

resulting in the wearing away of mountains and the building up of such landscape features as flood plains and coastal plains. Synonym: natural erosion.

Erosion (accelerated). Erosion much more rapid than geologic erosion, mainly as a result of the activities of man or other animals or of a catastrophe in nature, for example, fire, that exposes the surface.

Excess fines (in tables). Excess silt and clay in the soil. The soil does not provide a source of gravel or sand for construction purposes.

Fast intake (in tables). The rapid movement of water into the soil.

Fertility, soil. The quality that enables a soil to provide plant nutrients, in adequate amounts and in proper balance, for the growth of specified plants when light, moisture, temperature, tilth, and other growth factors are favorable.

Field moisture capacity. The moisture content of a soil, expressed as a percentage of the ovendry weight, after the gravitational, or free, water has drained away; the field moisture content 2 or 3 days after a soaking rain; also called *normal field capacity, normal moisture capacity,* or *capillary capacity.*

Fine textured soil. Sandy clay, silty clay, and clay.

Flood plain. A nearly level alluvial plain that borders a stream and is subject to flooding unless protected artificially.

Foot slope. The inclined surface at the base of a hill.

Fragipan. A loamy, brittle subsurface horizon low in porosity and content of organic matter and low or moderate in clay but high in silt or very fine sand. A fragipan appears cemented and restricts roots. When dry, it is hard or very hard and has a higher bulk density than the horizon or horizons above. When moist, it tends to rupture suddenly under pressure rather than to deform slowly.

Gleyed soil. Soil that formed under poor drainage, resulting in the reduction of iron and other elements in the profile and in gray colors and mottles.

Grassed waterway. A natural or constructed waterway, typically broad and shallow, seeded to grass as protection against erosion. Conducts surface water away from cropland.

Gravel. Rounded or angular fragments of rock up to 3 inches (2 millimeters to 7.5 centimeters) in diameter. An individual piece is a pebble.

Gravelly soil material. Material that is 15 to 50 percent, by volume, rounded or angular rock fragments, not prominently flattened, up to 3 inches (7.5 centimeters) in diameter.

Ground water (geology). Water filling all the unblocked pores of underlying material below the water table.

Gully. A miniature valley with steep sides cut by running water and through which water ordinarily runs only after rainfall. The distinction between a gully and a rill is one of depth. A gully generally is an obstacle to farm machinery and is too deep to be obliterated by ordinary tillage; a rill is of lesser depth and can be smoothed over by ordinary tillage.

Hardpan. A hardened or cemented soil horizon, or layer. The soil material is sandy, loamy, or clayey and is cemented by iron oxide, silica, calcium carbonate, or other substance.

Horizon, soil. A layer of soil, approximately parallel to the surface, having distinct characteristics produced by soil-forming processes. In the identification of soil horizons, an upper case letter represents the major horizons. Numbers or lower case letters that follow represent subdivisions of the major horizons. An explanation of the subdivisions is given in the *Soil Survey Manual*. The major horizons of mineral soil are as follows:

O horizon.—An organic layer of fresh and decaying plant residue at the surface of a mineral soil.

A horizon.—The mineral horizon at or near the surface in which an accumulation of humified organic matter is mixed with the mineral material. Also, a plowed surface horizon, most of which was originally part of a B horizon.

B horizon.—The mineral horizon below an A horizon. The B horizon is in part a layer of transition from the overlying A to the underlying C horizon. The B horizon also has distinctive characteristics such as (1) accumulation of clay, sesquioxides, humus, or a combination of these; (2) prismatic or blocky structure; (3) redder or browner colors than those in the A horizon; or (4) a combination of these. The combined A and B horizons are generally called the solum, or true soil. If a soil does not have a B horizon, the A horizon alone is the solum.

C horizon.—The mineral horizon or layer, excluding indurated bedrock, that is little affected by soil-forming processes and does not have the properties typical of the A or B horizon. The material of a C horizon may be either like or unlike that in which the solum formed. If the material is known to differ from that in the solum, the Roman numeral II precedes the letter C.

R layer.—Consolidated rock beneath the soil. The rock commonly underlies a C horizon, but can be directly below an A or a B horizon.

Hydrologic soil groups. Refers to soils grouped according to their runoff-producing characteristics. The chief consideration is the inherent capacity of soil bare of vegetation to permit infiltration. The slope and the kind of plant cover are not considered but are separate factors in predicting runoff. Soils are assigned to four groups. In group A are soils having a high infiltration rate when thoroughly wet and having a low runoff potential. They are mainly deep, well drained, and sandy or gravelly. In group D, at the other extreme, are soils having a very slow

infiltration rate and thus a high runoff potential. They have a claypan or clay layer at or near the surface, have a permanent high water table, or are shallow over nearly impervious bedrock or other material. A soil is assigned to two hydrologic groups if part of the acreage is artificially drained and part is undrained.

Illuviation. The movement of soil material from one horizon to another in the soil profile. Generally, material is removed from an upper horizon and deposited in a lower horizon.

Impervious soil. A soil through which water, air, or roots penetrate slowly or not at all. No soil is absolutely impervious to air and water all the time.

Infiltration. The downward entry of water into the immediate surface of soil or other material, as contrasted with percolation, which is movement of water through soil layers or material.

Infiltration rate. The rate at which water penetrates the surface of the soil at any given instant, usually expressed in inches per hour. The rate can be limited by the infiltration capacity of the soil or the rate at which water is applied at the surface.

Intake rate. The average rate of water entering the soil under irrigation. Most soils have a fast initial rate; the rate decreases with application time. Therefore, intake rate for design purposes is not a constant but is a variable depending on the net irrigation application. The rate of water intake in inches per hour is expressed as follows:

Less than 0.2	very low
0.2 to 0.4	low
0.4 to 0.75	moderately low
0.75 to 1.25	moderate
1.25 to 1.75	moderately high
1.75 to 2.5	high
More than 2.5	very high

Irrigation. Application of water to soils to assist in production of crops. Methods of irrigation are—

Border.—Water is applied at the upper end of a strip in which the lateral flow of water is controlled by small earth ridges called border dikes, or borders.

Basin.—Water is applied rapidly to nearly level plains surrounded by levees or dikes.

Controlled flooding.—Water is released at intervals from closely spaced field ditches and distributed uniformly over the field.

Corrugation.—Water is applied to small, closely spaced furrows or ditches in fields of close-growing crops or in orchards so that it flows in only one direction.

Drip.—Water is applied slowly and under low pressure through such applicators as orifices, emitters, porous tubing, or perforated pipe on the surface or in the soil.

Drip (or trickle).—Water is applied slowly and under low pressure to the surface of the soil or into the soil through such applicators as emitters, porous tubing, or perforated pipe.

Furrow.—Water is applied in small ditches made by cultivation implements. Furrows are used for tree and row crops.

Sprinkler.—Water is sprayed over the soil surface through pipes or nozzles from a pressure system.

Subirrigation.—Water is applied in open ditches or tile lines until the water table is raised enough to wet the soil.

Wild flooding.—Water, released at high points, is allowed to flow onto an area without controlled distribution.

Large stones (in tables). Rock fragments 3 inches (7.5 centimeters) or more across. Large stones adversely affect the specified use of the soil.

Leaching. The removal of soluble material from soil or other material by percolating water.

Liquid limit. The moisture content at which the soil passes from a plastic to a liquid state.

Loam. Soil material that is 7 to 27 percent clay particles, 28 to 50 percent silt particles, and less than 52 percent sand particles.

Loess. Fine grained material, dominantly of silt-sized particles, deposited by wind.

Low strength. The soil is not strong enough to support loads.

Medium textured soil. Very fine sandy loam, loam, silt loam, or silt.

Moderately coarse textured soil. Sandy loam and fine sandy loam.

Moderately fine textured soil. Clay loam, sandy clay loam, and silty clay loam.

Morphology, soil. The physical makeup of the soil, including the texture, structure, porosity, consistence, color, and other physical, mineral, and biological properties of the various horizons, and the thickness and arrangement of those horizons in the soil profile.

Mottling, soil. Irregular spots of different colors that vary in number and size. Mottling generally indicates poor aeration and impeded drainage. Descriptive terms are as follows: abundance—*few, common,* and *many*; size—*fine, medium,* and *coarse*; and contrast—*faint, distinct,* and *prominent*. The size measurements are of the diameter along the greatest dimension. *Fine* indicates less than 5 millimeters (about 0.2 inch); *medium*, from 5 to 15 millimeters (about 0.2 to 0.6 inch); and *coarse*, more than 15 millimeters (about 0.6 inch).

Munsell notation. A designation of color by degrees of the three simple variables—hue, value, and chroma. For example, a notation of 10YR 6/4 is a color of 10YR hue, value of 6, and chroma of 4.

Neutral soil. A soil having a pH value between 6.6 and 7.3. (See Reaction, soil.)

Nutrient, plant. Any element taken in by a plant essential to its growth. Plant nutrients are mainly

nitrogen, phosphorus, potassium, calcium, magnesium, sulfur, iron, manganese, copper, boron, and zinc obtained from the soil and carbon, hydrogen, and oxygen obtained from the air and water.

Organic matter. Plant and animal residue in the soil in various stages of decomposition.

Pan. A compact, dense layer in a soil that impedes the movement of water and the growth of roots. For example, *hardpan, fragipan, claypan, plowpan,* and *traffic pan.*

Parent material. The unconsolidated organic and mineral material in which soil forms.

Ped. An individual natural soil aggregate, such as a granule, a prism, or a block.

Pedon. The smallest volume that can be called "a soil." A pedon is three dimensional and large enough to permit study of all horizons. Its area ranges from about 10 to 100 square feet (1 square meter to 10 square meters), depending on the variability of the soil.

Percolation. The downward movement of water through the soil.

Percs slowly (in tables). The slow movement of water through the soil adversely affecting the specified use.

Permeability. The quality of the soil that enables water to move downward through the profile. Permeability is measured as the number of inches per hour that water moves downward through the saturated soil. Terms describing permeability are:

Very slow	less than 0.06 inch
Slow	0.06 to 0.20 inch
Moderately slow	0.2 to 0.6 inch
Moderate	0.6 inch to 2.0 inches
Moderately rapid	2.0 to 6.0 inches
Rapid	6.0 to 20 inches
Very rapid	more than 20 inches

Phase, soil. A subdivision of a soil series based on features that affect its use and management. For example, slope, stoniness, and thickness.

pH value. A numerical designation of acidity and alkalinity in soil. (See Reaction, soil.)

Piping (in tables). Formation of subsurface tunnels or pipelike cavities by water moving through the soil.

Plasticity index. The numerical difference between the liquid limit and the plastic limit; the range of moisture content within which the soil remains plastic.

Plastic limit. The moisture content at which a soil changes from semisolid to plastic.

Ponding. Standing water on soils in closed depressions. The water can be removed only by percolation or evapotranspiration.

Poorly graded. Refers to a coarse grained soil or soil material consisting mainly of particles of nearly the same size. Because there is little difference in size of the particles, density can be increased only slightly by compaction.

Productivity, soil. The capability of a soil for producing a specified plant or sequence of plants under specific management.

Profile, soil. A vertical section of the soil extending through all its horizons and into the parent material.

Reaction, soil. A measure of acidity or alkalinity of a soil, expressed in pH values. A soil that tests to pH 7.0 is described as precisely neutral in reaction because it is neither acid nor alkaline. The degree of acidity or alkalinity is expressed as—

	pH
Extremely acid	Below 4.5
Very strongly acid	4.5 to 5.0
Strongly acid	5.1 to 5.5
Medium acid	5.6 to 6.0
Slightly acid	6.1 to 6.5
Neutral	6.6 to 7.3
Mildly alkaline	7.4 to 7.8
Moderately alkaline	7.9 to 8.4
Strongly alkaline	8.5 to 9.0
Very strongly alkaline	9.1 and higher

Regolith. The unconsolidated mantle of weathered rock and soil material on the earth's surface; the loose earth material above the solid rock.

Residuum (residual soil material). Unconsolidated, weathered, or partly weathered mineral material that accumulated as consolidated rock disintegrated in place.

Rock fragments. Rock or mineral fragments having a diameter of 2 millimeters or more; for example, pebbles, cobbles, stones, and boulders.

Rooting depth (in tables). Shallow root zone. The soil is shallow over a layer that greatly restricts roots.

Root zone. The part of the soil that can be penetrated by plant roots.

Runoff. The precipitation discharged into stream channels from an area. The water that flows off the surface of the land without sinking into the soil is called surface runoff. Water that enters the soil before reaching surface streams is called ground-water runoff or seepage flow from ground water.

Sand. As a soil separate, individual rock or mineral fragments from 0.05 millimeter to 2.0 millimeters in diameter. Most sand grains consist of quartz. As a soil textural class, a soil that is 85 percent or more sand and not more than 10 percent clay.

Sandstone. Sedimentary rock containing dominantly sand-size particles.

Seepage (in tables). The movement of water through the soil. Seepage adversely affects the specified use.

Sequum. A sequence consisting of an illuvial horizon and the overlying eluvial horizon. (See Eluviation.)

Series, soil. A group of soils that have profiles that are almost alike, except for differences in texture of the surface layer or of the underlying material. All the soils of a series have horizons that are similar in composition, thickness, and arrangement.

Shale. Sedimentary rock formed by the hardening of a clay deposit.

Shrink-swell. The shrinking of soil when dry and the swelling when wet. Shrinking and swelling can damage roads, dams, building foundations, and other structures. It can also damage plant roots.

Silt. As a soil separate, individual mineral particles that range in diameter from the upper limit of clay (0.002 millimeter) to the lower limit of very fine sand (0.05 millimeter). As a soil textural class, soil that is 80 percent or more silt and less than 12 percent clay.

Siltstone. Sedimentary rock made up of dominantly silt-sized particles.

Site index. A designation of the quality of a forest site based on the height of the dominant stand at an arbitrarily chosen age. For example, if the average height attained by dominant and codominant trees in a fully stocked stand at the age of 50 years is 75 feet, the site index is 75 feet.

Slope. The inclination of the land surface from the horizontal. Percentage of slope is the vertical distance divided by horizontal distance, then multiplied by 100. Thus, a slope of 20 percent is a drop of 20 feet in 100 feet of horizontal distance.

Slow refill (in tables). The slow filling of ponds, resulting from restricted permeability in the soil.

Small stones (in tables). Rock fragments less than 3 inches (7.5 centimeters) in diameter. Small stones adversely affect the specified use of the soil.

Soil. A natural, three-dimensional body at the earth's surface. It is capable of supporting plants and has properties resulting from the integrated effect of climate and living matter acting on earthy parent material, as conditioned by relief over periods of time.

Soil separates. Mineral particles less than 2 mm in equivalent diameter and ranging between specified size limits. The names and sizes of separates recognized in the United States are as follows:

	Millimeters
Very coarse sand	2.0 to 1.0
Coarse sand	1.0 to 0.5
Medium sand	0.5 to 0.25
Fine sand	0.25 to 0.10
Very fine sand	0.10 to 0.05
Silt	0.05 to 0.002
Clay	less than 0.002

Solum. The upper part of a soil profile, above the C horizon, in which the processes of soil formation are active. The solum in soil consists of the A and B horizons. Generally, the characteristics of the material in these horizons are unlike those of the underlying material. The living roots and plant and animal activities are largely confined to the solum.

Stones. Rock fragments 10 to 24 inches (25 to 60 centimeters) in diameter.

Stony. Refers to a soil containing stones in numbers that interfere with or prevent tillage.

Structure, soil. The arrangement of primary soil particles into compound particles or aggregates. The principal forms of soil structure are—*platy* (laminated), *prismatic* (vertical axis of aggregates longer than horizontal), *columnar* (prisms with rounded tops), *blocky* (angular or subangular), and *granular. Structureless* soils are either *single grained* (each grain by itself, as in dune sand) or *massive* (the particles adhering without any regular cleavage, as in many hardpans).

Subsoil. Technically, the B horizon; roughly, the part of the solum below plow depth.

Substratum. The part of the soil below the solum.

Subsurface layer. Technically, the A2 horizon. Generally refers to a leached horizon lighter in color and lower in content of organic matter than the overlying surface layer.

Surface layer. The soil ordinarily moved in tillage, or its equivalent in uncultivated soil, ranging in depth from 4 to 10 inches (10 to 25 centimeters). Frequently designated as the "plow layer," or the "Ap horizon."

Terrace. An embankment, or ridge, constructed across sloping soils on the contour or at a slight angle to the contour. The terrace intercepts surface runoff so that water soaks into the soil or flows slowly to a prepared outlet. A terrace in a field is generally built so that the field can be farmed. A terrace intended mainly for drainage has a deep channel that is maintained in permanent sod.

Texture, soil. The relative proportions of sand, silt, and clay particles in a mass of soil. The basic textural classes, in order of increasing proportion of fine particles, are *sand, loamy sand, sandy loam, loam, silt loam, silt, sandy clay loam, clay loam, silty clay loam, sandy clay, silty clay,* and *clay*. The sand, loamy sand, and sandy loam classes may be further divided by specifying "coarse," "fine," or "very fine."

Thin layer (in tables). Otherwise suitable soil material too thin for the specified use.

Tilth, soil. The physical condition of the soil as related to tillage, seedbed preparation, seedling emergence, and root penetration.

Toe slope. The outermost inclined surface at the base of a hill; part of a foot slope.

Topsoil. The upper part of the soil, which is the most favorable material for plant growth. It is ordinarily rich in organic matter and is used to topdress roadbanks, lawns, and land affected by mining.

Upland (geology). Land at a higher elevation, in general, than the alluvial plain or stream terrace; land above the lowlands along streams.

Valley fill. In glaciated regions, material deposited in stream valleys by glacial melt water. In nonglaciated regions, alluvium deposited by heavily loaded streams.

Variant, soil. A soil having properties sufficiently different from those of other known soils to justify a new series name, but occurring in such a limited geographic area that creation of a new series is not justified.

Weathering. All physical and chemical changes produced in rocks or other deposits at or near the earth's surface by atmospheric agents. These changes result in disintegration and decomposition of the material.

Well graded. Refers to soil material consisting of coarse grained particles that are well distributed over a wide range in size or diameter. Such soil normally can be easily increased in density and bearing properties by compaction. Contrasts with poorly graded soil.

Wilting point (or permanent wilting point). The moisture content of soil, on an ovendry basis, at which a plant (specifically sunflower) wilts so much that it does not recover when placed in a humid, dark chamber.

tables

TABLE 1.--TEMPERATURE AND PRECIPITATION

[Recorded in the period 1951-78 at Nimrod Dam, Arkansas]

Month	Temperature						Precipitation				
				2 years in 10 will have--				2 years in 10 will have--			
	Average daily maximum	Average daily minimum	Average daily	Maximum temperature higher than--	Minimum temperature lower than--	Average number of growing degree days[1]	Average	Less than--	More than--	Average number of days with 0.10 inch or more	Average snowfall
	°F	°F	°F	°F	°F	Units	In	In	In		In
January----	49.4	25.1	37.0	74	3	15	3.23	1.46	4.74	5	1.0
February---	54.5	29.5	41.8	78	9	36	3.04	1.61	4.30	6	.9
March------	62.0	36.9	49.5	84	18	133	5.02	2.71	7.04	8	.2
April------	73.7	47.7	60.8	89	27	329	4.66	2.22	6.77	7	.0
May--------	81.1	55.9	68.5	93	37	574	5.24	2.51	7.60	7	.0
June-------	88.3	63.6	75.9	100	49	777	3.80	1.29	5.86	6	.0
July-------	92.9	67.7	80.3	104	54	939	3.34	1.71	4.76	6	.0
August-----	92.1	65.9	79.0	104	54	899	3.11	1.39	4.58	5	.0
September--	85.5	59.5	72.6	100	42	678	3.68	1.49	5.51	5	.0
October----	75.9	47.1	61.5	93	29	368	2.92	.93	4.54	4	.0
November---	62.5	36.2	49.4	82	15	97	4.00	1.86	5.84	5	.2
December---	52.7	28.7	40.7	74	9	15	3.78	1.68	5.56	6	.4
Yearly:											
Average--	72.6	47.0	59.8	---	---	---	---	---	---	---	---
Extreme--	---	---	---	105	1	---	---	---	---	---	---
Total----	---	---	---	---	---	4,860	45.82	37.70	53.16	70	2.7

[1]A growing degree day is a unit of heat available for plant growth. It can be calculated by adding the maximum and minimum daily temperatures, dividing the sum by 2, and subtracting the temperature below which growth is minimal for the principal crops in the area (50° F).

TABLE 2.--FREEZE DATES IN SPRING AND FALL

[Recorded in the period 1951-78 at Nimrod Dam, Arkansas]

Probability	Temperature		
	24° F or lower	28° F or lower	32° F or lower
Last freezing temperature in spring:			
1 year in 10 later than--	March 26	April 12	April 20
2 years in 10 later than--	March 20	April 6	April 15
5 years in 10 later than--	March 8	March 26	April 7
First freezing temperature in fall:			
1 year in 10 earlier than--	October 31	October 25	October 14
2 years in 10 earlier than--	November 6	October 30	October 20
5 years in 10 earlier than--	November 18	November 8	October 30

TABLE 3.--GROWING SEASON

[Recorded in the period 1951-78 at Nimrod Dam, Arkansas]

Probability	Daily minimum temperature during growing season		
	Higher than 24° F	Higher than 28° F	Higher than 32° F
	Days	Days	Days
9 years in 10	227	206	184
8 years in 10	236	213	191
5 years in 10	253	226	205
2 years in 10	271	240	218
1 year in 10	280	247	225

TABLE 4.--ACREAGE AND PROPORTIONATE EXTENT OF THE SOILS

Map symbol	Soil name	Acres	Percent
1	Allen loam, 3 to 8 percent slopes	1,060	0.3
2	Barling silt loam, occasionally flooded	8,860	2.5
3	Cane fine sandy loam, 3 to 8 percent slopes	1,580	0.5
4	Carnasaw gravelly silt loam, 3 to 8 percent slopes	7,045	2.0
5	Carnasaw-Pirum association, undulating	25,285	7.2
6	Carnasaw-Pirum-Clebit association, rolling	86,125	24.4
7	Carnasaw-Pirum-Clebit association, steep	104,945	29.8
8	Ceda gravelly loam, frequently flooded	7,945	2.3
9	Clebit-Carnasaw-Pirum association, very steep	9,170	2.6
10	Enders gravelly fine sandy loam, 3 to 8 percent slopes	2,255	0.6
11	Enders gravelly fine sandy loam, 8 to 12 percent slopes	1,750	0.5
12	Enders stony fine sandy loam, 12 to 20 percent slopes	5,560	1.6
13	Enders stony fine sandy loam, 20 to 45 percent slopes	4,305	1.2
14	Gallion silt loam, 0 to 1 percent slopes	1,230	0.3
15	Guthrie silt loam, occasionally flooded	13,450	3.8
16	Leadvale silt loam, 1 to 3 percent slopes	11,350	3.2
17	Leadvale silt loam, 3 to 8 percent slopes	6,685	1.9
18	Linker fine sandy loam, 3 to 8 percent slopes	1,525	0.4
19	Linker fine sandy loam, 8 to 12 percent slopes	1,690	0.5
20	McKamie silt loam, 3 to 8 percent slopes	2,360	0.7
21	Moreland silty clay, 0 to 1 percent slopes	3,540	1.0
22	Mountainburg-Rock outcrop complex, 3 to 20 percent slopes	1,420	0.4
23	Muskogee silt loam, 1 to 3 percent slopes	2,720	0.8
24	Muskogee silt loam, 3 to 8 percent slopes	2,525	0.7
25	Perry clay, occasionally flooded	6,115	1.7
26	Roxana very fine sandy loam, 0 to 1 percent slopes	2,090	0.6
27	Roxana very fine sandy loam, 1 to 3 percent slopes	2,130	0.6
28	Sherwood fine sandy loam, 3 to 8 percent slopes	11,935	3.4
29	Spadra fine sandy loam, 0 to 2 percent slopes	8,060	2.3
30	Taft silt loam, 0 to 1 percent slopes	3,600	1.0
31	Wrightsville silt loam, 0 to 1 percent slopes	3,430	1.0
	Small water[1]	836	0.2
	Approximate land area[2]	352,576	100
	Large water[3]	6,464	---
	Total area[4]	359,040	100.0

[1] Enclosed areas of water less than 40 acres and streams, sloughs, and canals less than one-eighth of a statute mile in width.

[2] 1974 Census of Agriculture.

[3] Enclosed areas of water more than 40 acres and streams, sloughs, and canals more than one-eighth of a statute mile in width.

[4] U.S. Department of Commerce, Bureau of the Census, EE-20, N. L. May 1970.

TABLE 5.--ACREAGE OF PRINCIPAL CROPS HARVESTED IN 1979 IN PERRY COUNTY, ARKANSAS

Crops	Acres
Soybeans	12,000
Rice	1,200
Wheat	1,000
Grain sorghum	1,200
Pasture and hay	42,000

TABLE 6.--NUMBER OF LIVESTOCK FOR STATED YEARS IN PERRY COUNTY, ARKANSAS

Livestock	1978	1979
All cattle and calves	14,000	14,000
Hogs and pigs	1,900	1,900
All poultry	4,000,000	6,000,000

TABLE 7.--YIELDS PER ACRE OF CROPS AND PASTURE

[Yields are those that can be expected under a high level of management. Absence of a yield indicates that the soil is not suited to the crop or the crop generally is not grown on the soil]

Soil name and map symbol	Soybeans	Rice	Wheat	Cotton lint	Common bermudagrass	Tall fescue	Bahiagrass
	Bu	Bu	Bu	Lb	AUM*	AUM*	AUM*
1---------- Allen	25	---	40	---	---	---	---
2---------- Barling	35	---	40	---	8.0	8.5	---
3---------- Cane	25	---	35	550	7.0	7.0	8.0
4---------- Carnasaw	---	---	---	---	4.0	4.0	6.0
5**:							
Carnasaw----------	---	---	---	---	4.0	4.0	6.0
Pirum----------	20	---	---	450	6.5	6.5	7.0
6**:							
Carnasaw----------	---	---	---	---	---	---	---
Pirum----------	---	---	---	---	5.5	5.5	6.0
Clebit----------	---	---	---	---	---	---	---
7**:							
Carnasaw----------	---	---	---	---	---	---	---
Pirum----------	---	---	---	---	---	---	---
Clebit----------	---	---	---	---	---	---	---
8---------- Ceda	---	---	---	---	---	---	---
9**:							
Clebit----------	---	---	---	---	---	---	---
Carnasaw----------	---	---	---	---	---	---	---
Pirum----------	---	---	---	---	---	---	---
10---------- Enders	---	---	25	---	5.0	5.0	6.0
11---------- Enders	---	---	---	---	4.0	4.0	5.5
12, 13---------- Enders	---	---	---	---	---	---	---
14---------- Gallion	40	---	---	875	7.0	8.0	8.5
15---------- Guthrie	20	---	20	---	5.5	5.5	6.0
16---------- Leadvale	30	---	40	550	7.0	7.0	7.5
17---------- Leadvale	25	---	35	500	6.5	6.5	7.0
18---------- Linker	20	---	30	500	5.5	5.5	6.0

See footnotes at end of table.

TABLE 7.--YIELDS PER ACRE OF CROPS AND PASTURE--Continued

Soil name and map symbol	Soybeans	Rice	Wheat	Cotton lint	Common bermuda-grass	Tall fescue	Bahiagrass
	Bu	Bu	Bu	Lb	AUM*	AUM*	AUM*
19--- Linker	---	---	---	---	5.0	4.5	5.5
20--- McKamie	25	---	---	---	5.0	5.0	5.5
21--- Moreland	35	130	---	625	6.0	7.5	---
22--- Mountainburg-Rock outcrop	---	---	---	---	---	---	---
23--- Muskogee	25	---	30	---	7.0	6.5	7.5
24--- Muskogee	20	---	25	---	7.0	6.0	7.5
25--- Perry	30	110	---	---	6.0	---	---
26--- Roxana	35	---	---	850	8.5	7.5	---
27--- Roxana	35	---	---	800	8.5	7.5	---
28--- Sherwood	---	---	---	---	4.5	4.0	---
29--- Spadra	30	---	40	---	7.0	8.5	7.5
30--- Taft	25	---	25	500	6.0	6.0	6.5
31--- Wrightsville	25	120	25	450	6.5	5.0	7.5

* Animal-unit-month: The amount of forage or feed required to feed one animal unit (one cow, one horse, one mule, five sheep, or five goats) for 30 days.

** See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 8.--WOODLAND MANAGEMENT AND PRODUCTIVITY

[Only the soils suitable for production of commercial trees are listed. Absence of an entry indicates that information was not available]

Soil name and map symbol	Woodland suitability group	Management concerns			Potential productivity		Trees to plant
		Erosion hazard	Equipment limitation	Seedling mortality	Common trees	Site index	
1---- Allen	3o7	Slight	Slight	Slight	Southern red oak----	70	Loblolly pine, shortleaf pine, southern red oak.
					White oak----	---	
					Yellow-poplar----	87	
					Shortleaf pine----	72	
					Sweetgum----	80	
2---- Barling	2o7	Slight	Slight	Slight	Southern red oak----	80	Eastern cottonwood, American sycamore, shortleaf pine, loblolly pine, sweetgum, green ash, Shumard oak, cherrybark oak.
					Sweetgum----	90	
					Eastern cottonwood----	96	
					Shortleaf pine----	80	
3---- Cane	3o7	Slight	Slight	Slight	Southern red oak----	70	Loblolly pine, shortleaf pine, southern red oak.
					Sweetgum----	80	
					Loblolly pine----	80	
					Shortleaf pine----	70	
					Eastern redcedar----	---	
					White oak----	---	
4---- Carnasaw	4o1	Slight	Slight	Slight	Shortleaf pine----	60	Loblolly pine, shortleaf pine.
					Loblolly pine----	70	
					Southern red oak----	60	
5*:							
Carnasaw----	4o1	Slight	Slight	Slight	Shortleaf pine----	60	Loblolly pine, shortleaf pine.
					Loblolly pine----	70	
					Southern red oak----	60	
Pirum----	3o7	Slight	Slight	Slight	Loblolly pine----	80	Loblolly pine, shortleaf pine, southern red oak.
					Shortleaf pine----	70	
					Southern red oak----	70	
					White oak----	70	
6*:							
Carnasaw----	4x2	Moderate	Moderate	Slight	Shortleaf pine----	60	Loblolly pine, shortleaf pine.
					Loblolly pine----	70	
					Southern red oak----	60	
Pirum----	3r8	Moderate	Moderate	Slight	Loblolly pine----	80	Loblolly pine, shortleaf pine, southern red oak.
					Shortleaf pine----	70	
					Southern red oak----	70	
					White oak----	70	
Clebit----	5x2	Moderate	Moderate	Moderate	Shortleaf pine----	40	Shortleaf pine, eastern redcedar.
					Eastern redcedar----	30	
					Post oak----	---	
					Blackjack oak----	---	
7*:							
Carnasaw----	5x3	Severe	Severe	Slight	Shortleaf pine----	50	Loblolly pine, shortleaf pine.
					Loblolly pine----	60	
					Southern red oak----	55	
Pirum----	4x9	Severe	Severe	Slight	Loblolly pine----	75	Loblolly pine, shortleaf pine, southern red oak.
					Shortleaf pine----	65	
					Southern red oak----	65	
					White oak----	65	
Clebit----	5x3	Severe	Severe	Moderate	Shortleaf pine----	40	Shortleaf pine, eastern redcedar.
					Eastern redcedar----	30	
					Post oak----	---	
					Blackjack oak----	---	

See footnote at end of table.

TABLE 8.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Woodland suitability group	Management concerns: Erosion hazard	Management concerns: Equipment limitation	Management concerns: Seedling mortality	Potential productivity: Common trees	Potential productivity: Site index	Trees to plant
8---------- Ceda	3f8	Slight	Slight	Moderate	Shortleaf pine--------- Southern red oak------- White oak---------- Sweetgum---------- American sycamore------	70 --- --- 80 80	Loblolly pine, shortleaf pine, American sycamore, sweetgum.
9*: Clebit----------	5x3	Severe	Severe	Moderate	Shortleaf pine--------- Eastern redcedar------- Post oak---------- Blackjack oak----------	40 30 --- ---	Shortleaf pine, eastern redcedar.
Carnasaw----------	5x3	Severe	Severe	Slight	Shortleaf pine--------- Loblolly pine--------- Southern red oak-------	50 60 55	Loblolly pine, shortleaf pine.
Pirum----------	4x9	Severe	Severe	Slight	Loblolly pine---------- Shortleaf pine--------- Southern red oak------- White oak----------	75 65 65 65	Loblolly pine, shortleaf pine, southern red oak.
10, 11---------- Enders	4o1	Slight	Slight	Slight	Southern red oak------- White oak----------	60 55	Loblolly pine, shortleaf pine, eastern redcedar.
12---------- Enders	4x2	Slight	Moderate	Slight	Southern red oak------- White oak---------- Eastern redcedar------- Shortleaf pine---------	60 55 40 60	Loblolly pine, shortleaf pine, eastern redcedar.
13---------- Enders	5x3	Severe	Severe	Slight	Southern red oak------- White oak---------- Eastern redcedar------- Shortleaf pine---------	50 50 35 50	Loblolly pine, shortleaf pine, eastern redcedar.
14---------- Gallion	2o4	Slight	Slight	Slight	Green ash---------- Cherrybark oak--------- Sweetgum---------- Water oak---------- Pecan---------- American sycamore------ Eastern cottonwood-----	80 95 93 --- --- --- 100	Eastern cottonwood, American sycamore, cherrybark oak, water oak.
15---------- Guthrie	2w9	Slight	Severe	Severe	Southern red oak------- Shortleaf pine--------- Willow oak---------- Sweetgum---------- Water oak----------	76 80 75 90 86	Loblolly pine, sweetgum, shortleaf pine, water oak.
16, 17---------- Leadvale	3o7	Slight	Slight	Slight	White oak---------- Loblolly pine---------- Shortleaf pine--------- Eastern redcedar-------	70 80 70 ---	Loblolly pine, shortleaf pine, eastern redcedar.
18, 19---------- Linker	4o1	Slight	Slight	Slight	Shortleaf pine--------- Southern red oak------- White oak---------- Eastern redcedar------- Loblolly pine----------	60 50 50 40 ---	Shortleaf pine, loblolly pine, eastern redcedar.
20---------- McKamie	3c2	Slight	Moderate	Moderate	Loblolly pine---------- Shortleaf pine---------	80 70	Loblolly pine.
21---------- Moreland	2w6	Slight	Severe	Moderate	Green ash---------- Eastern cottonwood----- Sweetgum---------- American sycamore------ Water oak----------	70 100 90 --- 90	Eastern cottonwood, American sycamore, sweetgum, water oak.

See footnote at end of table.

TABLE 8.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Woodland suitability group	Management concerns			Potential productivity		Trees to plant
		Erosion hazard	Equipment limitation	Seedling mortality	Common trees	Site index	
22*:							
Mountainburg	5x3	Moderate	Severe	Moderate	Shortleaf pine	50	Shortleaf pine, eastern redcedar, loblolly pine.
					Eastern redcedar	30	
					Loblolly pine	---	
Rock outcrop.							
23, 24 Muskogee	3o7	Slight	Slight	Slight	Shortleaf pine	70	Loblolly pine, shortleaf pine, eastern redcedar, Shumard oak, sweetgum.
					Sweetgum	80	
					Loblolly pine	---	
					Water oak	---	
					Southern red oak	---	
25 Perry	2w6	Slight	Severe	Moderate	Cherrybark oak	80	Eastern cottonwood, sweetgum, green ash, cherrybark oak, water oak, willow oak.
					Eastern cottonwood	90	
					Green ash	72	
					Sweetgum	92	
					Water oak	82	
					Pecan	---	
					Water hickory	---	
26, 27 Roxana	1o4	Slight	Slight	Slight	Eastern cottonwood	115	Eastern cottonwood, American sycamore, cherrybark oak.
					Sweetgum	100	
					Pecan	---	
					American sycamore	---	
					Water oak	---	
					Cherrybark oak	---	
28 Sherwood	3o7	Slight	Slight	Slight	Shortleaf pine	70	Shortleaf pine, southern red oak.
					Southern red oak	60	
					White oak	55	
					Sweetgum	60	
29 Spadra	2o7	Slight	Slight	Slight	Shortleaf pine	80	Loblolly pine, shortleaf pine, black walnut, black locust, southern red oak, eastern redcedar.
					Southern red oak	80	
					Eastern redcedar	60	
30 Taft	3w8	Slight	Moderate	Moderate	Water oak	76	Loblolly pine, shortleaf pine, water oak, sweetgum.
					Loblolly pine	80	
					Sweetgum	80	
					Shortleaf pine	70	
31 Wrightsville	4w9	Slight	Severe	Moderate	Loblolly pine	70	Loblolly pine, sweetgum, water oak, willow oak.
					Sweetgum	70	
					Water oak	70	

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 9.--RECREATIONAL DEVELOPMENT

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not rated]

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails
1 Allen	Slight	Slight	Moderate: slope, small stones.	Slight.
2 Barling	Severe: floods.	Moderate: wetness.	Moderate: wetness, floods.	Slight.
3 Cane	Moderate: wetness.	Moderate: wetness.	Moderate: slope, small stones, wetness.	Slight.
4 Carnasaw	Moderate: percs slowly.	Moderate: percs slowly.	Severe: small stones.	Slight.
5*: Carnasaw	Moderate: percs slowly.	Moderate: percs slowly.	Severe: small stones.	Slight.
Pirum	Slight	Slight	Moderate: slope, small stones, depth to rock.	Slight.
6*: Carnasaw	Moderate: slope, small stones, percs slowly.	Moderate: slope, small stones, percs slowly.	Severe: slope, small stones.	Severe: erodes easily.
Pirum	Moderate: slope, small stones.	Moderate: slope, small stones.	Severe: slope.	Slight.
Clebit	Severe: small stones, depth to rock.	Severe: small stones, depth to rock.	Severe: slope, small stones, depth to rock.	Moderate: large stones.
7*: Carnasaw	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Severe: slope, erodes easily.
Pirum	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Clebit	Severe: slope, small stones, depth to rock.	Severe: slope, small stones, depth to rock.	Severe: slope, small stones, depth to rock.	Severe: slope.
8 Ceda	Severe: floods, small stones.	Severe: small stones.	Severe: floods, small stones.	Moderate: floods.
9*: Clebit	Severe: slope, small stones, depth to rock.	Severe: slope, small stones, depth to rock.	Severe: slope, small stones, depth to rock.	Severe: slope.

See footnote at end of table.

TABLE 9.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails
9*:				
Carnasaw	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Severe: slope, erodes easily.
Pirum	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
10 Enders	Severe: percs slowly.	Severe: percs slowly.	Severe: small stones, percs slowly.	Slight.
11 Enders	Severe: percs slowly.	Severe: percs slowly.	Severe: slope, small stones, percs slowly.	Slight.
12 Enders	Severe: slope, percs slowly.	Severe: slope, percs slowly.	Severe: slope, small stones, percs slowly.	Severe: erodes easily.
13 Enders	Severe: slope, percs slowly.	Severe: slope, percs slowly.	Severe: slope, small stones, percs slowly.	Severe: slope, erodes easily.
14 Gallion	Slight	Slight	Slight	Slight.
15 Guthrie	Severe: floods, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
16, 17 Leadvale	Moderate: wetness, percs slowly.	Moderate: wetness, percs slowly.	Moderate: slope, wetness, percs slowly.	Slight.
18 Linker	Slight	Slight	Moderate: slope, small stones.	Slight.
19 Linker	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight.
20 McKamie	Severe: percs slowly.	Severe: percs slowly.	Severe: percs slowly.	Slight.
21 Moreland	Severe: wetness, percs slowly, too clayey.	Severe: wetness, too clayey, percs slowly.	Severe: too clayey, wetness.	Severe: wetness, too clayey.
22*:				
Mountainburg	Severe: small stones, depth to rock.	Severe: small stones, depth to rock.	Severe: slope, small stones, depth to rock.	Severe: large stones, small stones.
Rock outcrop.				
23, 24 Muskogee	Severe: wetness.	Moderate: wetness, percs slowly.	Severe: wetness.	Slight.

See footnote at end of table.

TABLE 9.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails
25--Perry	Severe: floods, wetness, percs slowly.	Severe: wetness, too clayey, percs slowly.	Severe: too clayey, wetness, percs slowly.	Severe: wetness, too clayey.
26--Roxana	Slight	Slight	Slight	Slight.
27--Roxana	Slight	Slight	Moderate: slope.	Slight.
28--Sherwood	Slight	Slight	Moderate: slope.	Slight.
29--Spadra	Severe: floods.	Slight	Moderate: small stones.	Slight.
30--Taft	Severe: wetness.	Moderate: wetness, percs slowly.	Severe: wetness.	Moderate: wetness.
31--Wrightsville	Severe: wetness, percs slowly.	Severe: wetness, percs slowly.	Severe: wetness, percs slowly.	Severe: wetness.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 10.--WILDLIFE HABITAT

[See text for definitions of "good," "fair," "poor," and "very poor." Absence of an entry indicates that the soil was not rated]

Soil name and map symbol	Potential for habitat elements							Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
1---------- Allen	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
2---------- Barling	Fair	Good	Good	Good	Poor	Poor	Poor	Good	Good	Poor.
3---------- Cane	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Fair	Very poor.
4---------- Carnasaw	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
5*:										
Carnasaw----------	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
Pirum----------	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
6*:										
Carnasaw----------	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
Pirum----------	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
Clebit----------	Very poor.	Poor	Poor	Very poor.	Very poor.	Very poor.	Very poor.	Poor	Very poor.	Very poor.
7*:										
Carnasaw----------	Very poor.	Poor	Good	Good	Good	Very poor.	Very poor.	Poor	Good	Very poor.
Pirum----------	Very poor.	Poor	Good	Good	Good	Very poor.	Very poor.	Poor	Good	Very poor.
Clebit----------	Very poor.	Poor	Poor	Very poor.	Very poor.	Very poor.	Very poor.	Poor	Very poor.	Very poor.
8---------- Ceda	Poor	Fair	Fair	Poor	Poor	Poor	Very poor.	Fair	Poor	Very poor.
9*:										
Clebit----------	Very poor.	Poor	Poor	Very poor.	Very poor.	Very poor.	Very poor.	Poor	Very poor.	Very poor.
Carnasaw----------	Very poor.	Poor	Good	Good	Good	Very poor.	Very poor.	Poor	Good	Very poor.
Pirum----------	Very poor.	Poor	Good	Good	Good	Very poor.	Very poor.	Poor	Good	Very poor.
10, 11---------- Enders	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
12---------- Enders	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
13---------- Enders	Very poor.	Very poor.	Good	Good	Good	Very poor.	Very poor.	Very poor.	Good	Very poor.

See footnote at end of table.

TABLE 10.--WILDLIFE HABITAT--Continued

Soil name and map symbol	Potential for habitat elements							Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
14--Gallion	Good	Good	Good	Good	---	Poor	Very poor.	Good	Good	Very poor.
15--Guthrie	Poor	Fair	Fair	Fair	Fair	Good	Good	Fair	Fair	Good.
16--Leadvale	Fair	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
17--Leadvale	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
18--Linker	Fair	Good	Good	Fair	Fair	Poor	Very poor.	Good	Fair	Very poor.
19--Linker	Fair	Good	Good	Fair	Fair	Very poor.	Very poor.	Good	Fair	Very poor.
20--McKamie	Fair	Good	Good	---	Fair	Very poor.	Very poor.	Good	Fair	Very poor.
21--Moreland	Fair	Fair	Fair	Good	---	Fair	Fair	Fair	Good	Fair.
22*:										
Mountainburg	Very poor.	Poor	Poor	Very poor.	Very poor.	Very poor.	Very poor.	Poor	Poor	Very poor.
Rock outcrop.										
23--Muskogee	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
24--Muskogee	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
25--Perry	Poor	Fair	Fair	Fair	---	Fair	Fair	Fair	Fair	Fair.
26, 27--Roxana	Good	Good	Good	Good	---	Poor	Very poor.	Good	Good	Very poor.
28--Sherwood	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
29--Spadra	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
30--Taft	Fair	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.
31--Wrightsville	Fair	Fair	Fair	Fair	Fair	Good	Good	Fair	Fair	Good.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 11.--BUILDING SITE DEVELOPMENT

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not rated]

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets
1 Allen	Moderate: too clayey.	Slight	Slight	Moderate: slope.	Moderate: low strength.
2 Barling	Severe: wetness.	Severe: floods.	Severe: floods, wetness.	Severe: floods.	Severe: floods.
3 Cane	Moderate: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness, slope.	Moderate: wetness.
4 Carnasaw	Moderate: too clayey.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: low strength, shrink-swell.
5*: Carnasaw	Moderate: too clayey.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: low strength, shrink-swell.
Pirum	Severe: depth to rock.	Moderate: depth to rock.	Severe: depth to rock.	Moderate: slope, depth to rock.	Moderate: depth to rock.
6*: Carnasaw	Moderate: too clayey, slope.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: shrink-swell, slope.	Severe: low strength, shrink-swell.
Pirum	Severe: depth to rock.	Moderate: slope, depth to rock.	Severe: depth to rock.	Severe: slope.	Moderate: depth to rock, slope.
Clebit	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Severe: slope, depth to rock.	Severe: depth to rock.
7*: Carnasaw	Severe: slope.	Severe: shrink-swell, slope.	Severe: slope, shrink-swell.	Severe: shrink-swell, slope.	Severe: low strength, slope, shrink-swell.
Pirum	Severe: depth to rock, slope.	Severe: slope.	Severe: depth to rock, slope.	Severe: slope.	Severe: slope.
Clebit	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, slope.
8 Ceda	Moderate: floods.	Severe: floods.	Severe: floods.	Severe: floods.	Severe: floods.
9*: Clebit	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, slope.
Carnasaw	Severe: slope.	Severe: shrink-swell, slope.	Severe: slope, shrink-swell.	Severe: shrink-swell, slope.	Severe: low strength, slope, shrink-swell.

See footnote at end of table.

TABLE 11.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets
9*: Pirum	Severe: depth to rock, slope.	Severe: slope.	Severe: depth to rock, slope.	Severe: slope.	Severe: slope.
10--Enders	Moderate: too clayey.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: low strength, shrink-swell.
11--Enders	Moderate: too clayey, slope.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: shrink-swell, slope.	Severe: low strength, shrink-swell.
12, 13--Enders	Severe: slope.	Severe: shrink-swell, slope.	Severe: slope, shrink-swell.	Severe: shrink-swell, slope.	Severe: low strength, slope, shrink-swell.
14--Gallion	Slight	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: low strength, shrink-swell.
15--Guthrie	Severe: wetness.	Severe: floods, wetness.	Severe: floods, wetness.	Severe: floods, wetness.	Severe: low strength, wetness, floods.
16--Leadvale	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: low strength, wetness.
17--Leadvale	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness, slope.	Moderate: low strength, wetness.
18--Linker	Severe: depth to rock.	Moderate: depth to rock.	Severe: depth to rock.	Moderate: slope, depth to rock.	Moderate: depth to rock.
19--Linker	Severe: depth to rock.	Moderate: slope, depth to rock.	Severe: depth to rock.	Severe: slope.	Moderate: depth to rock, slope.
20--McKamie	Severe: too clayey.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: low strength, shrink-swell.
21--Moreland	Severe: wetness.	Severe: wetness, shrink-swell.	Severe: wetness, shrink-swell.	Severe: wetness, shrink-swell.	Severe: low strength, wetness, shrink-swell.
22*: Mountainburg	Severe: depth to rock, large stones.	Severe: depth to rock, large stones.	Severe: depth to rock, large stones.	Severe: slope, depth to rock, large stones.	Severe: depth to rock, large stones.
Rock outcrop.					
23, 24--Muskogee	Severe: wetness.	Severe: wetness, shrink-swell.	Severe: wetness, shrink-swell.	Severe: wetness, shrink-swell.	Severe: low strength, shrink-swell.
25--Perry	Severe: wetness.	Severe: floods, wetness, shrink-swell.	Severe: floods, wetness, shrink-swell.	Severe: floods, wetness, shrink-swell.	Severe: low strength, wetness, floods.

See footnote at end of table.

TABLE 11.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets
26, 27---------- Roxana	Severe: cutbanks cave.	Slight----------	Moderate: wetness.	Slight----------	Slight.
28---------- Sherwood	Moderate: depth to rock.	Slight----------	Moderate: depth to rock.	Moderate: slope.	Slight.
29---------- Spadra	Slight----------	Severe: floods.	Severe: floods.	Severe: floods.	Moderate: floods.
30---------- Taft	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: low strength.
31---------- Wrightsville	Severe: wetness.	Severe: wetness, shrink-swell.	Severe: wetness, shrink-swell.	Severe: wetness, shrink-swell.	Severe: low strength, wetness, shrink-swell.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 12.--SANITARY FACILITIES

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," "good," "fair," and other terms. Absence of an entry indicates that the soil was not rated]

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
1--- Allen	Moderate: percs slowly.	Moderate: seepage, slope.	Moderate: too clayey.	Slight---	Fair: too clayey.
2--- Barling	Severe: floods, wetness.	Severe: floods, wetness.	Severe: floods, wetness.	Severe: floods.	Fair: wetness.
3--- Cane	Severe: wetness, percs slowly.	Moderate: slope.	Moderate: wetness.	Moderate: wetness.	Fair: wetness.
4--- Carnasaw	Severe: percs slowly.	Moderate: depth to rock, slope.	Severe: depth to rock, too clayey.	Moderate: depth to rock.	Poor: too clayey, hard to pack.
5*:					
Carnasaw---	Severe: percs slowly.	Moderate: depth to rock, slope.	Severe: depth to rock, too clayey.	Moderate: depth to rock.	Poor: too clayey, hard to pack.
Pirum---	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Poor: area reclaim.
6*:					
Carnasaw---	Severe: percs slowly.	Severe: slope.	Severe: depth to rock, too clayey.	Moderate: depth to rock, slope.	Poor: too clayey, hard to pack.
Pirum---	Severe: depth to rock.	Severe: depth to rock, slope.	Severe: depth to rock.	Severe: depth to rock.	Poor: area reclaim.
Clebit---	Severe: depth to rock.	Severe: depth to rock, slope, seepage.	Severe: depth to rock, seepage.	Severe: depth to rock, seepage.	Poor: area reclaim, small stones, thin layer.
7*:					
Carnasaw---	Severe: percs slowly, slope.	Severe: slope.	Severe: depth to rock, slope, too clayey.	Severe: slope.	Poor: too clayey, hard to pack, slope.
Pirum---	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Poor: area reclaim, slope.
Clebit---	Severe: depth to rock, slope.	Severe: depth to rock, slope, seepage.	Severe: depth to rock, seepage, slope.	Severe: depth to rock, seepage, slope.	Poor: area reclaim, small stones, slope.
8--- Ceda	Severe: floods, poor filter.	Severe: seepage, floods.	Severe: floods, seepage.	Severe: floods, seepage.	Poor: small stones, seepage.

See footnote at end of table

TABLE 12.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
9*:					
Clebit	Severe: depth to rock, slope.	Severe: depth to rock, slope, seepage.	Severe: depth to rock, seepage, slope.	Severe: depth to rock, seepage, slope.	Poor: area reclaim, small stones, slope.
Carnasaw	Severe: percs slowly, slope.	Severe: slope.	Severe: depth to rock, slope, too clayey.	Severe: slope.	Poor: too clayey, hard to pack, slope.
Pirum	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Poor: area reclaim, slope.
10--- Enders	Severe: percs slowly.	Moderate: depth to rock, slope.	Severe: depth to rock, too clayey.	Moderate: depth to rock.	Poor: too clayey, hard to pack.
11--- Enders	Severe: percs slowly.	Severe: slope.	Severe: depth to rock, too clayey.	Moderate: depth to rock, slope.	Poor: too clayey, hard to pack.
12, 13--- Enders	Severe: percs slowly, slope.	Severe: slope.	Severe: depth to rock, slope, too clayey.	Severe: slope.	Poor: too clayey, hard to pack, slope.
14--- Gallion	Moderate: percs slowly.	Moderate: seepage.	Moderate: too clayey.	Slight	Fair: too clayey.
15--- Guthrie	Severe: wetness, floods, percs slowly.	Slight	Severe: wetness.	Severe: wetness.	Poor: wetness.
16, 17--- Leadvale	Severe: wetness, percs slowly.	Severe: wetness.	Severe: depth to rock.	Moderate: depth to rock, wetness.	Fair: area reclaim, too clayey.
18--- Linker	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Poor: area reclaim, thin layer.
19--- Linker	Severe: depth to rock.	Severe: depth to rock, slope.	Severe: depth to rock.	Severe: depth to rock.	Poor: area reclaim, thin layer.
20--- McKamie	Severe: percs slowly.	Moderate: slope.	Severe: too clayey.	Slight	Poor: too clayey.
21--- Moreland	Severe: wetness, percs slowly.	Slight	Severe: wetness, too clayey.	Severe: wetness.	Poor: too clayey, hard to pack, wetness.
22*:					
Mountainburg	Severe: depth to rock, large stones.	Severe: seepage, depth to rock, slope.	Severe: depth to rock, seepage.	Severe: depth to rock, seepage.	Poor: area reclaim, small stones, thin layer.
Rock outcrop.					
23, 24--- Muskogee	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness, too clayey.	Severe: wetness.	Poor: too clayey, hard to pack, wetness.

See footnote at end of table.

TABLE 12.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
25---------- Perry	Severe: floods, wetness, percs slowly.	Severe: floods, wetness.	Severe: floods, wetness, too clayey.	Severe: floods, wetness.	Poor: too clayey, hard to pack, wetness.
26---------- Roxana	Moderate: wetness, percs slowly.	Moderate: seepage.	Severe: wetness.	Moderate: wetness.	Fair: thin layer.
27---------- Roxana	Moderate: wetness, percs slowly.	Moderate: seepage, slope.	Severe: wetness.	Moderate: wetness.	Fair: thin layer.
28---------- Sherwood	Moderate: percs slowly, depth to rock.	Moderate: seepage, depth to rock, slope.	Severe: depth to rock.	Slight----------	Fair: thin layer, area reclaim.
29---------- Spadra	Moderate: floods, percs slowly.	Severe: floods.	Moderate: floods.	Moderate: floods.	Good.
30---------- Taft	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Poor: wetness.
31---------- Wrightsville	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness, too clayey.	Severe: wetness.	Poor: too clayey, hard to pack, wetness.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 13.--CONSTRUCTION MATERIALS

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "good," "fair," "poor," "probable," and "improbable." Absence of an entry indicates that the soil was not rated]

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
1 Allen	Fair: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones.
2 Barling	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Good.
3 Cane	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones, thin layer.
4 Carnasaw	Poor: low strength, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, thin layer.
5*: Carnasaw	Poor: low strength, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, thin layer.
Pirum	Poor: area reclaim, thin layer.	Improbable: excess fines.	Improbable: excess fines.	Fair: area reclaim, small stones, thin layer.
6*: Carnasaw	Poor: low strength, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, thin layer.
Pirum	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Fair: area reclaim, small stones, slope.
Clebit	Poor: area reclaim, thin layer.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, small stones, thin layer.
7*: Carnasaw	Poor: low strength, slope, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.
Pirum	Poor: area reclaim, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: large stones, slope.
Clebit	Poor: area reclaim, slope, thin layer.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, small stones, slope.
8 Ceda	Good	Improbable: small stones.	Probable	Poor: small stones, area reclaim.
9*: Clebit	Poor: area reclaim, slope, thin layer.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, small stones, slope.

See footnote at end of table.

TABLE 13.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
9*:				
Carnasaw	Poor: low strength, slope, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.
Pirum	Poor: area reclaim, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: large stones, slope.
10, 11 Enders	Poor: low strength, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer.
12 Enders	Poor: low strength, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope, thin layer.
13 Enders	Poor: low strength, slope, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope, thin layer.
14 Gallion	Fair: low strength, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Good.
15 Guthrie	Poor: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
16, 17 Leadvale	Fair: area reclaim, low strength, thin layer.	Improbable: excess fines.	Improbable: excess fines.	Good.
18, 19 Linker	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
20 McKamie	Poor: low strength, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer.
21 Moreland	Poor: low strength, wetness, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, wetness.
22*:				
Mountainburg	Poor: area reclaim, large stones, thin layer.	Improbable: excess fines, large stones.	Improbable: excess fines, large stones.	Poor: area reclaim, small stones, thin layer.
Rock outcrop.				
23, 24 Muskogee	Poor: low strength, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Fair: thin layer.
25 Perry	Poor: low strength, wetness, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, wetness.
26, 27 Roxana	Fair: thin layer.	Improbable: excess fines.	Improbable: excess fines.	Good.

See footnote at end of table.

TABLE 13.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
28--- Sherwood	Fair: thin layer.	Improbable: excess fines.	Improbable: excess fines.	Fair: thin layer.
29--- Spadra	Good---	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones.
30--- Taft	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer.
31--- Wrightsville	Poor: low strength, wetness, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer, wetness.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 14.--WATER MANAGEMENT

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not evaluated]

Soil name and map symbol	Limitations for--		Features affecting--			
	Pond reservoir areas	Embankments, dikes, and levees	Drainage	Irrigation	Terraces and diversions	Grassed waterways
1---------- Allen	Moderate: seepage.	Severe: piping.	Deep to water	Slope----------	Favorable-----	Favorable.
2---------- Barling	Moderate: seepage.	Severe: piping.	Floods--------	Wetness, erodes easily floods.	Erodes easily, wetness.	Favorable.
3---------- Cane	Moderate: seepage.	Severe: piping.	Percs slowly, slope.	Wetness, percs slowly, rooting depth	Erodes easily, wetness, rooting depth	Erodes easily, rooting depth
4---------- Carnasaw	Moderate: depth to rock.	Moderate: thin layer, hard to pack.	Deep to water	Percs slowly, slope, erodes easily	Erodes easily, percs slowly.	Erodes easily, percs slowly.
5*: Carnasaw----------	Moderate: depth to rock.	Moderate: thin layer, hard to pack.	Deep to water	Percs slowly, slope, erodes easily	Erodes easily, percs slowly.	Erodes easily, percs slowly.
Pirum----------	Moderate: seepage, depth to rock.	Severe: piping.	Deep to water	Depth to rock, slope.	Depth to rock	Depth to rock.
6*: Carnasaw----------	Moderate: depth to rock.	Moderate: thin layer, hard to pack.	Deep to water	Percs slowly, slope, erodes easily	Slope, erodes easily percs slowly.	Slope, erodes easily percs slowly.
Pirum----------	Moderate: seepage, depth to rock.	Severe: piping.	Deep to water	Depth to rock, slope.	Slope, depth to rock	Slope, depth to rock.
Clebit----------	Severe: depth to rock, seepage.	Severe: thin layer.	Deep to water	Large stones, droughty, depth to rock	Slope, large stones, depth to rock	Large stones, slope, droughty.
7*: Carnasaw----------	Severe: slope.	Moderate: thin layer, hard to pack.	Deep to water	Percs slowly, slope, erodes easily	Slope, erodes easily percs slowly.	Slope, erodes easily percs slowly.
Pirum----------	Severe: slope.	Severe: piping.	Deep to water	Depth to rock, slope.	Slope, large stones, depth to rock	Large stones, slope, depth to rock.
Clebit----------	Severe: depth to rock, slope, seepage.	Severe: thin layer.	Deep to water	Large stones, droughty, depth to rock	Slope, large stones, depth to rock	Large stones, slope, droughty.
8---------- Ceda	Severe: seepage.	Severe: seepage.	Deep to water	Floods, droughty.	Favorable-----	Droughty.
9*: Clebit----------	Severe: depth to rock, slope, seepage.	Severe: thin layer.	Deep to water	Large stones, droughty, depth to rock	Slope, large stones, depth to rock	Large stones, slope, droughty.
Carnasaw----------	Severe: slope.	Moderate: thin layer, hard to pack.	Deep to water	Percs slowly, slope, erodes easily	Slope, erodes easily percs slowly.	Slope, erodes easily, percs slowly.

See footnote at end of table.

TABLE 14.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for--		Features affecting--			
	Pond reservoir areas	Embankments, dikes, and levees	Drainage	Irrigation	Terraces and diversions	Grassed waterways
9*: Pirum	Severe: slope.	Severe: piping.	Deep to water	Depth to rock, slope.	Slope, large stones, depth to rock	Large stones, slope, depth to rock.
10--- Enders	Moderate: depth to rock.	Moderate: thin layer, hard to pack.	Deep to water	Percs slowly, slope.	Percs slowly	Percs slowly
11--- Enders	Moderate: depth to rock.	Moderate: thin layer, hard to pack.	Deep to water	Percs slowly, slope.	Slope, percs slowly.	Slope, percs slowly.
12--- Enders	Moderate: depth to rock.	Moderate: hard to pack, thin layer.	Deep to water	Percs slowly, slope, erodes easily	Slope, erodes easily percs slowly.	Slope, erodes easily, percs slowly.
13--- Enders	Severe: slope.	Moderate: hard to pack, thin layer.	Deep to water	Percs slowly, slope, erodes easily	Slope, erodes easily percs slowly.	Slope, erodes easily, percs slowly.
14--- Gallion	Moderate: seepage.	Moderate: piping.	Deep to water	Erodes easily	Erodes easily	Favorable.
15--- Guthrie	Slight---	Severe: piping, wetness.	Percs slowly, floods.	Wetness, percs slowly, rooting depth	Erodes easily, wetness, rooting depth	Wetness, rooting depth.
16--- Leadvale	Moderate: seepage, depth to rock.	Severe: piping.	Percs slowly	Wetness, percs slowly, rooting depth	Erodes easily, wetness.	Erodes easily, rooting depth
17--- Leadvale	Moderate: seepage, depth to rock.	Severe: piping.	Percs slowly, slope.	Wetness, percs slowly, rooting depth	Erodes easily, wetness.	Erodes easily, rooting depth.
18--- Linker	Moderate: seepage, depth to rock.	Severe: piping.	Deep to water	Depth to rock, slope.	Depth to rock	Depth to rock.
19--- Linker	Moderate: seepage, depth to rock.	Severe: piping.	Deep to water	Depth to rock, slope.	Slope, depth to rock	Slope, depth to rock.
20--- McKamie	Slight---	Moderate: hard to pack.	Deep to water	Slope, erodes easily percs slowly.	Erodes easily, percs slowly.	Erodes easily.
21--- Moreland	Slight---	Severe: hard to pack, wetness.	Percs slowly	Wetness, slow intake, percs slowly.	Wetness, percs slowly.	Wetness, percs slowly.
22*: Mountainburg	Severe: depth to rock, seepage.	Severe: large stones, thin layer.	Deep to water	Slope, large stones, depth to rock	Slope, large stones, depth to rock	Large stones, slope, droughty.
Rock outcrop.						
23--- Muskogee	Slight---	Moderate: hard to pack, wetness.	Percs slowly	Wetness, percs slowly, erodes easily	Erodes easily, wetness, percs slowly.	Wetness, erodes easily, percs slowly.
24--- Muskogee	Slight---	Moderate: hard to pack, wetness.	Percs slowly, slope.	Wetness, percs slowly, slope.	Erodes easily, wetness, percs slowly.	Wetness, erodes easily, percs slowly.

See footnote at end of table.

TABLE 14.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for--		Features affecting--			
	Pond reservoir areas	Embankments, dikes, and levees	Drainage	Irrigation	Terraces and diversions	Grassed waterways
25---------- Perry	Slight---------	Severe: hard to pack, wetness.	Percs slowly, floods.	Wetness, slow intake, percs slowly.	Wetness, percs slowly.	Wetness, percs slowly.
26, 27---------- Roxana	Moderate: seepage.	Severe: piping.	Deep to water	Erodes easily	Erodes easily	Erodes easily.
28---------- Sherwood	Moderate: seepage, depth to rock.	Moderate: piping.	Deep to water	Slope---------	Favorable-----	Favorable.
29---------- Spadra	Moderate: seepage.	Severe: piping.	Deep to water	Erodes easily	Erodes easily	Erodes easily.
30---------- Taft	Moderate: seepage.	Severe: piping.	Percs slowly	Wetness, percs slowly, rooting depth	Erodes easily, wetness, rooting depth	Wetness, rooting depth.
31---------- Wrightsville	Slight---------	Severe: hard to pack, wetness.	Percs slowly	Wetness, percs slowly, erodes easily	Erodes easily, wetness, percs slowly.	Wetness, percs slowly.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 15.--ENGINEERING INDEX PROPERTIES

[The symbol < means less than; > means more than. Absence of an entry indicates that data were not estimated]

Soil name and map symbol	Depth	USDA texture	Classification		Fragments > 3 inches	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
1---------- Allen	0-12	Loam----------	ML, CL-ML, SM, SM-SC	A-4	0-5	90-100	75-100	65-98	40-80	<26	NP-7
	12-72	Clay loam, sandy clay loam, loam.	CL-ML, CL	A-4, A-6, A-7	0-10	85-100	75-100	65-98	50-80	22-43	5-19
2---------- Barling	0-8	Silt loam--------	ML	A-4	0	100	100	90-100	70-90	<20	NP-3
	8-75	Silt loam, loam, very fine sandy loam.	ML, CL, CL-ML	A-4, A-6	0	100	100	90-100	70-90	<30	NP-12
3---------- Cane	0-10	Fine sandy loam	ML, SM ML-CL	A-4	0-2	80-100	75-100	65-95	40-75	<30	NP-7
	10-29	Silty clay loam, sandy clay loam, clay loam.	ML, CL-ML, CL	A-4, A-6	0-2	90-100	80-100	75-100	60-85	17-32	3-12
	29-94	Silt clay, loam, clay loam.	ML, CL-ML, CL	A-4, A-6	0-2	90-100	80-100	75-100	55-85	18-37	3-15
4---------- Carnasaw	0-14	Gravelly silt loam.	GM, GC, SM, ML	A-4, A-2, A-1	0-5	55-95	55-95	35-95	20-75	<30	NP-10
	14-28	Silty clay loam, clay loam, clay.	CL, CH	A-6, A-7	0	80-95	80-95	75-95	65-95	37-65	16-35
	28-48	Clay, silty clay	CL, CH	A-7	0	80-95	80-95	80-95	70-95	41-65	18-35
	48-60	Weathered bedrock	---	---	---	---	---	---	---	---	---
5*:											
Carnasaw--------	0-14	Gravelly silt loam.	GM, GC, SM, ML	A-4, A-2, A-1	0-5	55-95	55-95	35-95	20-75	<30	NP-10
	14-28	Silty clay loam, clay loam, clay.	CL, CH	A-6, A-7	0	80-95	80-95	75-95	65-95	37-65	16-35
	28-48	Clay, silty clay	CL, CH	A-7	0	80-95	80-95	80-95	70-95	41-65	18-35
	48-60	Weathered bedrock	---	---	---	---	---	---	---	---	---
Pirum----------	0-13	Fine sandy loam	SM, ML	A-4	0	75-100	75-100	70-90	35-65	<20	NP-3
	13-36	Sandy clay loam, clay loam, loam.	CL, CL-ML	A-4, A-6	0	75-100	75-100	70-90	50-70	22-35	5-15
	36-42	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
6*:											
Carnasaw--------	0-11	Stony silt loam	GM, GC, SM, ML	A-4, A-2, A-1	5-35	55-95	55-95	35-95	20-95	<30	NP-10
	11-27	Silty clay loam, clay loam, clay.	CL, CH	A-6, A-7	0	80-95	80-95	75-95	65-95	37-65	16-35
	27-48	Clay, silty clay	CL, CH	A-7	0	80-95	80-95	80-95	70-95	41-65	18-35
	48-60	Weathered bedrock	---	---	---	---	---	---	---	---	---
Pirum----------	0-12	Gravelly fine sandy loam.	SM, ML	A-4	0	75-100	60-80	50-70	40-60	<20	NP-3
	12-34	Sandy clay loam, clay loam, loam.	CL, CL-ML	A-4, A-6	0	75-100	75-100	70-90	50-70	22-35	5-15
	34-42	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Clebit----------	0-5	Stony fine sandy loam.	GM, GC, GM-GC	A-4, A-2, A-1	10-30	35-60	35-60	30-55	15-50	<31	NP-10
	5-14	Very gravelly loam, very gravelly fine sandy loam.	GM, GC, GM-GC	A-4, A-2, A-1	30-40	35-60	35-60	30-55	15-50	<31	NP-10
	14-16	Unweathered bedrock.	---	---	---	---	---	---	---	---	---

See footnote at end of table.

TABLE 15.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag-ments > 3 inches	Percentage passing sieve number--				Liquid limit	Plas-ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
7*:											
Carnasaw--------	0-11	Stony silt loam	GM, GC, SM, ML	A-4, A-2, A-1	5-35	55-95	55-95	35-95	20-95	<30	NP-10
	11-27	Silty clay loam, clay loam, clay.	CL, CH	A-6, A-7	0	80-95	80-95	75-95	65-95	37-65	16-35
	27-48	Clay, silty clay	CL, CH	A-7	0	80-95	80-95	80-95	70-95	41-65	18-35
	48-60	Weathered bedrock	---	---	---	---	---	---	---	---	---
Pirum----------	0-10	Stony fine sandy loam.	SM, ML	A-4	10-35	75-100	75-100	70-90	36-65	<20	NP-3
	10-32	Sandy clay loam, clay loam, loam.	CL, CL-ML	A-4, A-6	0-10	75-100	75-100	70-90	50-70	22-35	5-15
	32-42	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Clebit----------	0-5	Stony fine sandy loam.	GM, GC, GM-GC	A-4, A-2, A-1	10-30	45-60	45-60	30-55	15-45	<31	NP-10
	5-14	Very gravelly loam, very gravelly fine sandy loam.	GM, GC, GM-GC	A-4, A-2, A-1	30-40	40-60	40-60	30-55	15-50	<31	NP-10
	14-16	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
8---------- Ceda	0-6	Gravelly loam----	SM, GM, SM-SC, GM-GC	A-2, A-4	0-10	50-85	65-85	55-75	30-49	22-29	2-7
	6-72	Very gravelly fine sandy loam, very gravelly loam.	GP, GM, GP-GM, GM-GC	A-2, A-4, A-6, A-1	0-10	20-60	10-50	5-50	3-45	<40	NP-14
9*:											
Clebit----------	0-5	Stony fine sandy loam.	GM, GC, GM-GC	A-4, A-2, A-1	10-30	45-60	45-60	30-55	15-45	<31	NP-10
	5-14	Very gravelly loam, very gravelly fine sandy loam.	GM, GC, GM-GC	A-4, A-2, A-1	30-40	40-60	40-60	30-55	15-50	<31	NP-10
	14-16	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Carnasaw--------	0-11	Stony silt loam	GM, GC, SM, ML	A-4, A-2, A-1	5-35	55-95	55-95	35-95	20-95	<30	NP-10
	11-27	Silty clay loam, clay loam, clay.	CL, CH	A-6, A-7	0	80-95	80-95	75-95	65-95	37-65	16-35
	27-48	Clay, silty clay	CL, CH	A-7	0	80-95	80-95	80-95	70-95	41-65	18-35
	48-60	Weathered bedrock	---	---	---	---	---	---	---	---	---
Pirum----------	0-10	Stony fine sandy loam.	SM, ML	A-4	10-35	75-100	75-100	70-90	36-65	<20	NP-3
	10-32	Sandy clay loam, clay loam, loam.	CL, CL-ML	A-4, A-6	0-10	75-100	75-100	70-90	50-70	22-35	5-15
	32-42	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
10, 11---------- Enders	0-8	Gravelly fine sandy loam.	ML, SM, SM-SC, CL-ML	A-2, A-4	0-15	50-95	35-75	30-70	30-60	20-35	2-10
	8-14	Clay loam, silty clay loam, loam.	CL	A-6	0	80-100	80-100	80-100	75-95	30-40	11-17
	14-56	Silty clay, clay	CH	A-7	0	95-100	85-100	85-100	70-95	65-80	35-45
	56-72	Weathered bedrock, unweathered bedrock.	---	---	---	---	---	---	---	---	---

See footnote at end of table.

TABLE 15.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag-ments > 3 inches	Percentage passing sieve number--				Liquid limit	Plas-ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
12, 13---------- Enders	0-6	Stony fine sandy loam.	SM, ML, SM-SC, CL-ML	A-4, A-2	20-40	80-90	70-80	65-75	30-60	20-35	2-10
	6-12	Stony silty clay loam.	CL	A-6	20-40	85-95	80-90	75-85	70-80	30-40	11-17
	12-46	Silty clay, clay	CH	A-7	0	95-100	85-100	85-100	70-95	50-65	30-40
	46-72	Weathered bedrock, unweathered bedrock.	---	---	---	---	---	---	---	---	---
14---------- Gallion	0-10	Silt loam--------	ML, CL-ML, CL	A-4, A-6	0	100	100	100	90-100	<28	NP-11
	10-50	Silt loam, silty clay loam, clay loam.	CL	A-6	0	100	100	100	90-100	28-40	11-17
	50-72	Stratified silty clay loam to very fine sandy loam.	CL, CL-ML	A-6, A-4	0	100	100	100	90-100	23-34	4-12
15---------- Guthrie	0-8	Silt loam--------	ML, CL-ML	A-4	0	100	100	90-100	85-95	18-28	2-7
	8-21	Silt loam, silty clay loam.	ML, CL-ML, CL	A-4, A-6	0	100	100	90-100	85-95	23-39	5-15
	21-72	Silty clay loam, silt loam.	CL, CL-ML	A-6, A-7, A-4	0-5	85-100	80-100	75-100	66-95	20-50	4-25
16, 17---------- Leadvale	0-6	Silt loam--------	ML, CL-ML, CL	A-4	0	100	95-100	85-95	65-85	18-32	2-10
	6-23	Silt loam, silty clay loam.	CL-ML, CL, ML	A-4, A-6	0	100	95-100	90-98	75-90	22-36	3-14
	23-37	Silt loam, silty clay loam.	CL-ML, CL, ML	A-4, A-6, A-7	0	100	95-100	80-98	70-90	23-42	3-18
	37-49	Silty clay loam, silty clay, clay.	CL, MH, ML, CH	A-6, A-7	0-5	90-100	90-100	85-95	70-90	32-58	12-26
	49-54	Weathered bedrock									
18, 19---------- Linker	0-8	Fine sandy loam	SM, SM-SC ML, CL-ML	A-4	0	85-100	80-100	70-100	40-70	<30	NP-7
	8-36	Loam, sandy clay loam, clay loam.	CL, SC, SM, ML	A-4, A-6	0-10	90-100	80-100	70-100	40-80	<40	NP-18
	36-40	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
20---------- McKamie	0-5	Silt loam--------	CL, CL-ML	A-6, A-4	0	100	100	95-100	80-100	20-40	5-22
	5-43	Clay, silty clay	CH, CL	A-7	0	100	100	95-100	80-100	45-70	22-40
	43-72	Silty clay loam, silt loam, very fine sandy loam.	CL, CL-ML	A-4, A-6	0	100	90-100	85-100	50-95	20-40	5-22
21---------- Moreland	0-17	Silty clay-------	CH	A-7	0	100	95-100	90-100	90-100	51-74	25-45
	17-47	Clay, silty clay	CH	A-7	0	100	95-100	90-100	90-100	51-74	25-45
	47-72	Clay, silty clay loam, silty clay.	CH, CL	A-7, A-6	0	100	100	100	90-100	35-74	25-45
22*: Mountainburg----	0-10	Stony fine sandy loam.	GM	A-1, A-2	30-60	40-50	30-50	20-40	15-25	<20	NP
	10-19	Very gravelly sandy clay loam, very stony loam, very stony fine sandy loam.	GM, GC, GM-GC	A-1, A-2	30-65	40-60	30-50	25-50	20-30	<30	NP-10
	19-22	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Rock outcrop.											

See footnote at end of table.

TABLE 15.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag-ments > 3 inches	Percentage passing sieve number--				Liquid limit	Plas-ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
23, 24---------- Muskogee	0-10	Silt loam---------	ML, CL, CL-ML	A-4	0	100	100	95-100	85-100	18-30	1-10
	10-20	Silty clay loam, silt loam.	CL, CH	A-6, A-7	0	100	100	95-100	90-100	35-55	15-30
	20-73	Silty clay, clay	CH	A-7	0	100	100	95-100	90-100	55-70	30-40
25---------- Perry	0-6	Clay--------------	CH, CL	A-7	0	100	100	100	95-100	45-75	22-45
	6-24	Clay--------------	CH	A-7	0	100	100	100	95-100	60-80	33-50
	24-72	Clay--------------	CH, CL	A-7	0	90-100	85-100	75-100	70-100	45-80	22-50
26, 27---------- Roxana	0-6	Very fine sandy loam.	ML, CL-ML	A-4	0	100	100	85-100	50-75	<27	NP-7
	6-72	Silt loam, very fine sandy loam, loamy very fine sand.	ML, CL-ML	A-4	0	100	100	85-100	50-85	<27	NP-7
28---------- Sherwood	0-16	Fine sandy loam	SM, SM-SC, ML, CL-ML	A-2, A-4	0	100	75-100	60-100	25-60	<25	NP-7
	16-28	Gravelly clay loam, gravelly loam, gravelly sandy clay loam.	SC, GC	A-4, A-6	0	55-75	50-75	45-70	36-50	25-40	8-18
	28-43	Gravelly loam, very gravelly loam, gravelly clay loam.	SC, GC	A-2, A-4, A-6	5-15	45-75	40-75	35-50	25-50	25-40	8-18
	43-48	Weathered bedrock	---	---	---	---	---	---	---	---	---
29---------- Spadra	0-7	Fine sandy loam	ML, SM	A-2, A-4	0	85-100	80-100	65-80	30-75	<20	NP-3
	7-30	Loam, sandy clay loam.	CL, CL-ML, ML	A-4, A-6	0	90-100	90-100	80-95	55-75	25-40	5-15
	30-72	Fine sandy loam, sandy loam, loam	ML, CL, SM, SC	A-4, A-2, A-1	0	70-100	70-100	40-85	20-65	<30	NP-10
30---------- Taft	0-11	Silt loam---------	CL-ML, ML	A-4	0	100	95-100	90-100	75-95	18-35	2-10
	11-22	Silt loam, silty clay loam.	CL-ML, CL	A-4, A-6	0	100	95-100	90-100	85-95	23-38	5-16
	22-60	Silt loam, silty clay loam.	CL-ML, CL	A-4, A-6, A-7	0	95-100	90-100	85-100	80-95	23-42	5-20
	60-76	Silty clay loam, silty clay, loam	ML, GC, CL SC	A-6, A-7	0-20	65-100	55-100	45-90	36-85	35-48	12-22
31---------- Wrightsville	0-18	Silt loam---------	ML, CL, CL-ML	A-4	0	100	95-100	90-100	75-100	<31	NP-10
	18-51	Silty clay, clay, silty clay loam.	CH, CL	A-7	0	100	100	95-100	90-100	41-65	22-40
	51-72	Silty clay loam, silty clay, clay	CL, CH	A-7, A-6	0	100	95-100	95-100	90-100	35-55	16-30

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 16.--PHYSICAL AND CHEMICAL PROPERTIES OF SOILS

[The symbol < means less than. Entries under "Erosion factors--T" apply to the entire profile. Entries under "Organic matter" apply only to the surface layer. Absence of an entry indicates that data were not available or were not estimated]

Soil name and map symbol	Depth	Clay <2mm	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors		Organic matter
								K	T	
	In	Pct	G/cm3	In/hr	In/in	pH				Pct
1----------	0-12	6-25	1.30-1.50	0.6-2.0	0.14-0.19	4.5-5.5	Low----------	0.24	5	.5-3
Allen	12-72	18-35	1.40-1.60	0.6-2.0	0.12-0.17	4.5-5.5	Low----------	0.20		
2----------	0-8	8-17	1.25-1.60	0.6-2.0	0.13-0.24	5.1-6.5	Low----------	0.37	5	1-4
Barling	8-75	12-24	1.25-1.60	0.6-2.0	0.15-0.24	4.5-6.5	Low----------	0.37		
3----------	0-10	7-18	1.30-1.40	0.6-2.0	0.10-0.18	5.1-6.5	Low----------	0.32	3	.5-3
Cane	10-29	18-30	1.30-1.50	0.6-2.0	0.14-0.19	4.5-6.0	Low----------	0.37		
	29-94	18-35	1.55-1.70	0.06-0.2	0.05-0.08	4.5-6.0	Low----------	0.37		
4----------	0-14	15-25	1.30-1.60	0.6-2.0	0.11-0.20	4.5-6.0	Low----------	0.37	4	.5-2
Carnasaw	14-28	35-40	1.45-1.70	0.2-0.6	0.12-0.20	4.5-5.5	High---------	0.37		
	28-48	40-60	1.35-1.60	0.06-0.2	0.02-0.13	4.5-5.5	High---------	0.32		
	48-60	---	---	---	---	---	----------	---		
5*:										
Carnasaw--------	0-14	15-25	1.30-1.60	0.6-2.0	0.11-0.20	4.5-6.0	Low----------	0.37	4	.5-2
	14-28	35-40	1.45-1.70	0.2-0.6	0.12-0.20	4.5-5.5	High---------	0.37		
	28-48	40-60	1.35-1.60	0.06-0.2	0.02-0.13	4.5-5.5	High---------	0.32		
	48-60	---	---	---	---	---	----------	---		
Pirum----------	0-13	18-27	1.30-1.60	0.6-2.0	0.12-0.16	4.5-5.5	Low----------	0.24	3	.5-2
	13-36	18-35	1.25-1.60	0.6-2.0	0.14-0.18	4.5-5.5	Low----------	0.32		
	36-42	---	---	---	---	---	----------	---		
6*:										
Carnasaw--------	0-11	15-25	1.30-1.60	0.6-2.0	0.11-0.20	4.5-6.0	Low----------	0.37	4	.5-2
	11-27	35-40	1.45-1.70	0.2-0.6	0.12-0.20	4.5-5.5	High---------	0.37		
	27-48	40-60	1.35-1.60	0.06-0.2	0.12-0.18	4.5-5.5	High---------	0.32		
	48-60	---	---	---	---	---	----------	---		
Pirum----------	0-12	18-27	1.30-1.60	0.6-2.0	0.10-0.14	4.5-5.5	Low----------	0.20	3	.5-2
	12-34	18-35	1.25-1.60	0.6-2.0	0.14-0.18	4.5-5.5	Low----------	0.32		
	34-42	---	---	---	---	---	----------	---		
Clebit----------	0-5	10-20	1.30-1.60	2.0-6.0	0.06-0.10	5.1-6.5	Low----------	0.20	1	.5-1
	5-14	10-20	1.40-1.65	2.0-6.0	0.06-0.10	5.1-6.5	Low----------	0.20		
	14-16	---	---	---	---	---	----------	---		
7*:										
Carnasaw--------	0-11	15-25	1.30-1.60	0.6-2.0	0.11-0.20	4.5-6.0	Low----------	0.37	4	.5-1
	11-27	35-40	1.45-1.70	0.2-0.6	0.12-0.20	4.5-5.5	High---------	0.37		
	27-48	40-60	1.35-1.60	0.06-0.2	0.12-0.18	4.5-5.5	High---------	0.32		
	48-60	---	---	---	---	---	----------	---		
Pirum----------	0-10	18-27	1.30-1.60	0.6-2.0	0.08-0.12	4.5-5.5	Low----------	0.20	3	.5-2
	10-32	18-35	1.25-1.60	0.6-2.0	0.12-0.16	4.5-5.5	Low----------	0.32		
	32-42	---	---	---	---	---	----------	---		
Clebit----------	0-5	10-20	1.30-1.60	2.0-6.0	0.06-0.10	5.1-6.5	Low----------	0.20	1	.5-1
	5-14	10-20	1.40-1.65	2.0-6.0	0.06-0.10	5.1-6.5	Low----------	0.20		
	14-16	---	---	---	---	---	----------	---		
8----------	0-6	10-18	1.20-1.35	6.0-20	0.05-0.15	5.6-6.5	Low----------	0.28	5	.5-1
Ceda	6-72	15-32	1.25-1.40	6.0-20	0.01-0.10	5.6-6.5	Low----------	0.28		
9*:										
Clebit----------	0-5	10-20	1.30-1.60	2.0-6.0	0.06-0.10	5.1-6.5	Low----------	0.20	1	.5-1
	5-14	10-20	1.40-1.65	2.0-6.0	0.06-0.10	5.1-6.5	Low----------	0.20		
	14-16	---	---	---	---	---	----------	---		

See footnote at end of table.

TABLE 16.--PHYSICAL AND CHEMICAL PROPERTIES OF SOILS--Continued

Soil name and map symbol	Depth	Clay <2mm	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors		Organic matter
								K	T	
	In	Pct	G/cm³	In/hr	In/in	pH				Pct
9*:										
Carnasaw	0-11	15-25	1.30-1.60	0.6-2.0	0.11-0.20	4.5-6.0	Low	0.37	4	.5-2
	11-27	35-40	1.45-1.70	0.2-0.6	0.12-0.20	4.5-5.5	High	0.37		
	27-48	40-60	1.35-1.60	0.06-0.2	0.12-0.18	4.5-5.5	High	0.32		
	48-60	---	---	---	---	---	---	---		
Pirum	0-10	18-27	1.30-1.60	0.6-2.0	0.08-0.12	4.5-5.5	Low	0.20	3	.5-2
	10-32	18-35	1.25-1.60	0.6-2.0	0.12-0.16	4.5-5.5	Low	0.32		
	32-42	---	---	---	---	---	---	---		
10, 11	0-8	10-25	1.25-1.60	0.6-2.0	0.07-0.15	3.6-5.5	Low	0.32	3	.5-2
Enders	8-14	15-35	1.25-1.60	0.2-0.6	0.15-0.22	3.6-5.5	Low	0.43		
	14-56	35-60	1.15-1.45	<0.06	0.12-0.18	3.6-5.5	High	0.37		
	56-72	---	---	---	---	---	---	---		
12, 13	0-6	10-25	1.25-1.60	0.6-2.0	0.15-0.22	3.6-5.5	Low	0.43	3	1-3
Enders	6-12	15-35	1.25-1.45	0.2-0.6	0.15-0.20	3.6-5.5	Low	0.28		
	12-46	35-60	1.15-1.45	<0.06	0.09-0.13	3.6-5.5	High	0.24		
	46-72	---	---	---	---	---	---	---		
14	0-10	14-27	1.35-1.65	0.6-2.0	0.21-0.23	5.6-7.3	Low	0.37	5	.5-2
Gallion	10-50	14-35	1.35-1.75	0.6-2.0	0.20-0.22	5.6-7.8	Moderate	0.32		
	50-72	14-35	1.35-1.75	0.6-2.0	0.20-0.23	6.1-8.4	Low	0.37		
15	0-8	10-25	1.35-1.55	0.6-2.0	0.20-0.22	3.6-5.0	Low	0.43	3	1-4
Guthrie	8-21	18-30	1.40-1.60	0.6-2.0	0.18-0.20	3.6-5.0	Low	0.43		
	21-72	18-35	1.60-1.75	0.06-0.2	0.03-0.05	3.6-5.0	Low	0.43		
16, 17	0-6	12-22	1.30-1.40	0.6-2.0	0.17-0.22	4.5-5.5	Low	0.43	3	.5-3
Leadvale	6-23	20-32	1.30-1.50	0.6-2.0	0.17-0.20	4.5-5.5	Low	0.43		
	23-37	20-35	1.55-1.70	0.06-0.6	0.06-0.11	4.5-5.5	Low	0.43		
	37-49	30-45	1.40-1.60	0.06-0.6	0.06-0.11	4.5-5.5	Low	0.24		
	49-54	---	---	---	---	---	---	---		
18, 19	0-8	5-20	1.30-1.60	0.6-2.0	0.11-0.20	3.6-5.5	Low	0.28	3	.5-2
Linker	8-36	18-35	1.30-1.60	0.6-2.0	0.11-0.20	3.6-5.5	Low	0.32		
	36-40	---	---	---	---	---	---	---		
20	0-5	18-35	1.42-1.76	0.6-2.0	0.16-0.22	5.1-6.5	Moderate	0.37	3	.5-2
McKamie	5-43	35-60	1.20-1.45	<0.06	0.18-0.20	4.5-6.0	High	0.32		
	43-72	14-35	1.40-1.76	0.2-2.0	0.14-0.22	4.5-8.4	Moderate	0.37		
21	0-17	39-50	1.20-1.50	<0.06	0.18-0.20	6.1-7.8	Very high	0.32	5	2-5
Moreland	17-47	39-60	1.20-1.45	<0.06	0.18-0.20	6.6-8.4	High	0.32		
	47-72	35-60	1.20-1.75	<0.2	0.18-0.21	7.4-8.4	Very high	0.32		
22*:										
Mountainburg	0-10	4-12	1.30-1.60	2.0-6.0	0.05-0.10	4.5-6.0	Low	0.17	1	1-4
	10-19	10-18	1.30-1.60	2.0-6.0	0.05-0.10	4.5-5.5	Low	0.24		
	19-22	---	---	---	---	---	---	---		
Rock outcrop.										
23, 24	0-10	10-27	1.25-1.50	0.6-2.0	0.16-0.24	4.5-6.0	Low	0.43	5	1-3
Muskogee	10-20	20-40	1.25-1.45	0.2-0.6	0.16-0.24	4.5-6.0	Moderate	0.37		
	20-73	30-55	1.20-1.45	0.06-0.2	0.14-0.18	4.5-7.8	High	0.32		
25	0-6	40-80	1.20-1.60	<0.06	0.17-0.20	4.5-6.0	High	0.24	5	.5-4
Perry	6-24	55-85	1.17-1.50	<0.06	0.17-0.20	5.1-7.3	Very high	0.28		
	24-72	55-85	1.17-1.50	<0.06	0.17-0.20	6.1-8.4	Very high	0.28		
26, 27	0-6	5-27	1.35-1.80	0.6-2.0	0.10-0.21	6.1-8.4	Low	0.37	5	.5-2
Roxana	6-72	10-18	1.35-1.80	0.6-2.0	0.10-0.19	6.6-8.4	Low	0.37		
28	0-16	5-20	1.30-1.60	2.0-6.0	0.10-0.20	4.5-6.0	Low	0.24	4	.5-2
Sherwood	16-28	18-35	1.30-1.60	0.6-2.0	0.09-0.15	4.5-5.5	Low	0.32		
	28-43	18-35	1.30-1.60	0.6-2.0	0.08-0.14	4.5-5.5	Low	0.32		
	43-48	---	---	---	---	---	---	---		

See footnote at end of table.

TABLE 16.--PHYSICAL AND CHEMICAL PROPERTIES OF SOILS--Continued

Soil name and map symbol	Depth	Clay <2mm	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors		Organic matter
								K	T	
	In	Pct	G/cm^3	In/hr	In/in	pH				Pct
29----------	0-7	10-26	1.30-1.60	0.6-2.0	0.11-0.24	4.5-6.0	Low----------	0.37	5	1-4
Spadra	7-30	18-32	1.30-1.60	0.6-2.0	0.12-0.20	4.5-6.0	Low----------	0.37		
	30-72	15-25	1.30-1.60	0.6-2.0	0.10-0.15	4.5-6.0	Low----------	0.24		
30----------	0-11	10-25	1.30-1.40	0.6-2.0	0.20-0.22	4.5-5.5	Low----------	0.43	3	2-4
Taft	11-22	18-35	1.30-1.50	0.6-2.0	0.18-0.20	4.5-5.5	Low----------	0.43		
	22-60	15-35	1.50-1.65	0.06-0.2	0.03-0.07	4.5-5.5	Low----------	0.43		
	60-76	8-45	1.35-1.60	0.2-0.6	0.01-0.03	4.5-5.5	Low----------	0.37		
31----------	0-18	10-25	1.25-1.50	0.2-0.6	0.16-0.24	3.6-5.5	Low----------	0.49	5	.5-2
Wrightsville	18-51	35-55	1.20-1.45	<0.06	0.14-0.22	3.6-6.0	High----------	0.37		
	51-72	28-45	1.20-1.50	<0.06	0.14-0.22	3.6-8.4	High----------	0.43		

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 17.--SOIL AND WATER FEATURES

[The definitions of "flooding" and "water table" in the text explain terms such as "rare," "brief," "apparent," and "perched." The symbol > means more than. Absence of an entry indicates that the feature is not a concern]

Soil name and map symbol	Hydrologic group	Flooding			High water table			Bedrock		Risk of corrosion	
		Frequency	Duration	Months	Depth	Kind	Months	Depth	Hardness	Uncoated steel	Concrete
					Ft			In			
1---------- Allen	B	None--------	---	---	>6.0	---	---	>60	---	Low------	Moderate.
2---------- Barling	C	Occasional	Brief-----	Dec-Apr	1.0-4.0	Perched	Dec-Apr	>60	---	Moderate	Moderate.
3---------- Cane	C	None--------	---	---	2.0-3.0	Perched	Nov-Mar	>60	---	Moderate	High.
4---------- Carnasaw	C	None--------	---	---	>6.0	---	---	40-60	Soft	High-----	High.
5*: Carnasaw--------- Pirum----------	C B	None-------- None--------	--- ---	--- ---	>6.0 >6.0	--- ---	--- ---	40-60 22-50	Soft Hard	High----- Low------	High. High.
6*, 7*: Carnasaw--------- Pirum---------- Clebit----------	C B D	None-------- None-------- None--------	--- --- ---	--- --- ---	>6.0 >6.0 >6.0	--- --- ---	--- --- ---	40-60 22-50 10-20	Soft Hard Hard	High----- Low------ Low------	High. High. Moderate.
8---------- Ceda	B	Frequent----	Very brief	Jan-Jun	>6.0	---	---	>60	---	Low------	Moderate.
9*: Clebit---------- Carnasaw--------- Pirum----------	D C B	None-------- None-------- None--------	--- --- ---	--- --- ---	>6.0 >6.0 >6.0	--- --- ---	--- --- ---	10-20 40-60 22-50	Hard Soft Hard	Low------ High----- Low------	Moderate. High. High.
10, 11, 12, 13---- Enders	C	None--------	---	---	>6.0	---	---	40-60	Soft	High-----	High.
14---------- Gallion	B	None--------	---	---	>6.0	---	---	>60	---	Moderate	Low.
15---------- Guthrie	D	Occasional	Brief-----	Jan-Apr	0.5-1.0	Perched	Jan-Apr	>60	---	High-----	High.
16, 17---------- Leadvale	C	None--------	---	---	2.0-3.0	Perched	Jan-Apr	>48	Soft	Moderate	Moderate.
18, 19---------- Linker	B	None--------	---	---	>6.0	---	---	20-40	Hard	Low------	High.
20---------- McKamie	D	None--------	---	---	>6.0	---	---	>60	---	High-----	Moderate.
21---------- Moreland	D	None--------	---	---	0-1.5	Perched	Dec-Apr	>60	---	High-----	Low.
22*: Mountainburg----- Rock outcrop.	D	None--------	---	---	>6.0	---	---	12-20	Hard	Low------	Moderate.
23, 24---------- Muskogee	C	None--------	---	---	1.0-2.0	Perched	Jan-Apr	>60	---	High-----	Moderate.
25---------- Perry	D	Occasional	Brief-----	Dec-Jun	0-2.0	Apparent	Dec-Apr	>60	---	High-----	Moderate.

See footnote at end of table.

TABLE 17.--SOIL AND WATER FEATURES--Continued

Soil name and map symbol	Hydrologic group	Flooding			High water table			Bedrock		Risk of corrosion	
		Frequency	Duration	Months	Depth	Kind	Months	Depth	Hardness	Uncoated steel	Concrete
					Ft			In			
26, 27--Roxana	B	None	---	---	4.0-6.0	Apparent	Dec-Apr	>60	---	Low	Low.
28--Sherwood	B	None	---	---	>6.0	---	---	30-60	Hard	Moderate	Moderate.
29--Spadra	B	Rare	---	---	>6.0	---	---	>60	---	Low	High.
30--Taft	C	None	---	---	1.0-2.0	Perched	Jan-Apr	>60	---	High	High.
31--Wrightsville	D	None	---	---	0.6-1.5	Perched	Dec-Apr	>60	---	High	High.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 18.--CLASSIFICATION OF THE SOILS

Soil name	Family or higher taxonomic class
Allen	Fine-loamy, siliceous, thermic Typic Paleudults
Barling	Coarse-silty, mixed, thermic Fluvaquentic Dystrochrepts
Cane	Fine-loamy, siliceous, thermic Typic Fragiudults
Carnasaw	Clayey, mixed, thermic Typic Hapludults
Ceda	Loamy-skeletal, siliceous, nonacid, thermic Typic Udifluvents
Clebit	Loamy-skeletal, siliceous, thermic Lithic Dystrochrepts
Enders	Clayey, mixed, thermic Typic Hapludults
Gallion	Fine-silty, mixed, thermic Typic Hapludalfs
Guthrie	Fine-silty, siliceous, thermic Typic Fragiaquults
Leadvale	Fine-silty, siliceous, thermic Typic Fragiudults
Linker	Fine-loamy, siliceous, thermic Typic Hapludults
McKamie	Fine, mixed, thermic Vertic Hapludalfs
Moreland	Fine, mixed, thermic Vertic Hapludolls
Mountainburg	Loamy-skeletal, siliceous, thermic Lithic Hapludults
Muskogee	Fine-silty, mixed, thermic Aquic Paleudalfs
Perry	Very-fine, montmorillonitic, nonacid, thermic Vertic Haplaquepts
Pirum	Fine-loamy, siliceous, thermic Typic Hapludults
Roxana	Coarse-silty, mixed, nonacid, thermic Typic Udifluvents
Sherwood	Fine-loamy, mixed, thermic Typic Hapludults
Spadra	Fine-loamy, siliceous, thermic Typic Hapludults
Taft	Fine-silty, siliceous, thermic Glossaquic Fragiudults
Wrightsville	Fine, mixed, thermic Typic Glossaqualfs

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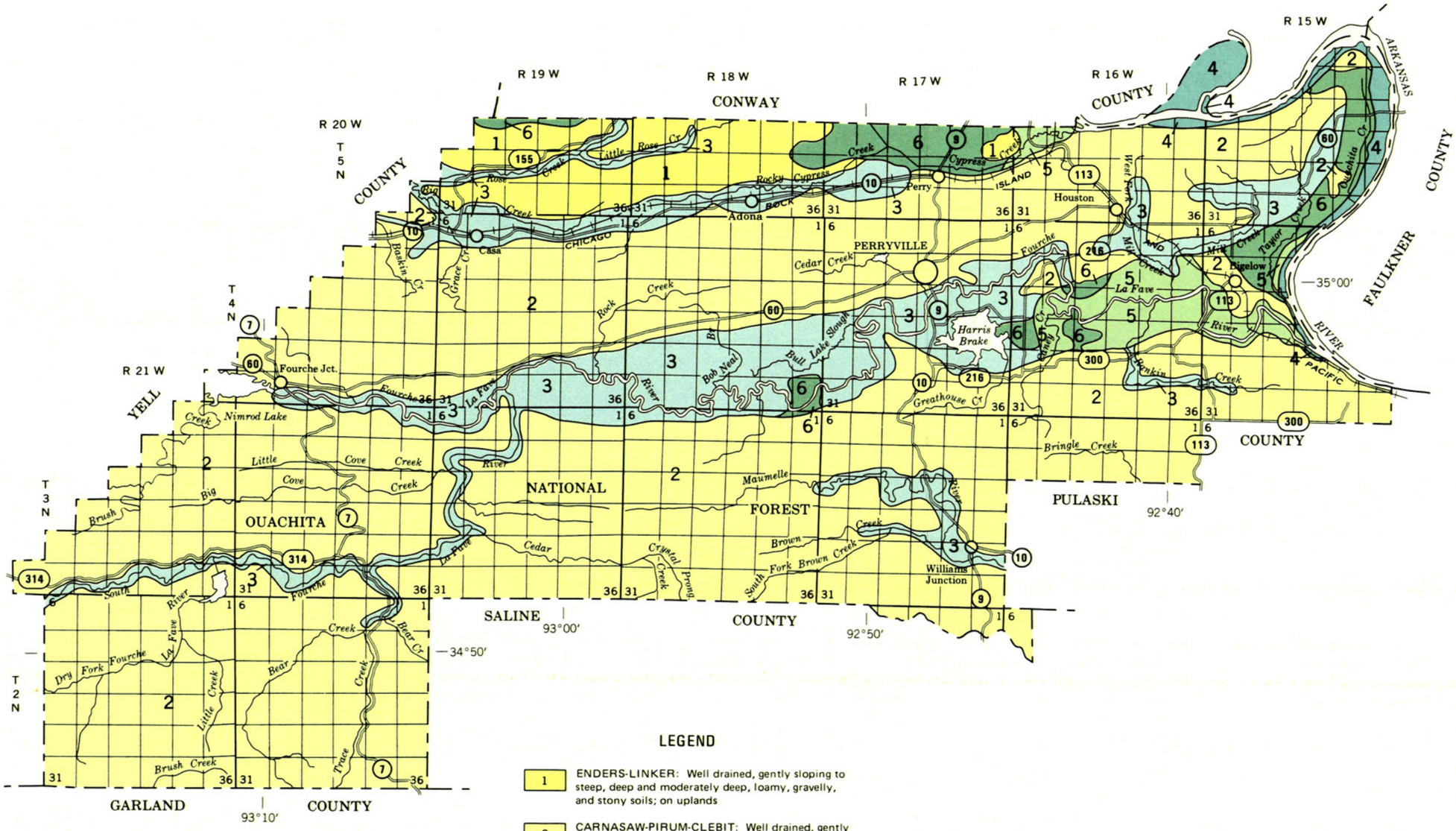


SECTIONALIZED TOWNSHIP

6	5	4	3	2	1
7	8	9	10	11	12
18	17	16	15	14	13
19	20	21	22	23	24
30	29	28	27	26	25
31	32	33	34	35	36

Each area outlined on this map consists of more than one kind of soil. The map is thus meant for general planning rather than a basis for decisions on the use of specific tracts.

LEGEND

1. ENDERS-LINKER: Well drained, gently sloping to steep, deep and moderately deep, loamy, gravelly, and stony soils; on uplands
2. CARNASAW-PIRUM-CLEBIT: Well drained, gently sloping to very steep, deep, moderately deep, and shallow, loamy, gravelly, and stony soils; on uplands
3. LEADVALE-GUTHRIE: Moderately well drained and poorly drained, level to gently sloping, deep, loamy soils; on local stream terraces and in depressions
4. ROXANA-GALLION: Well drained, level to nearly level, deep, loamy soils; on flood plains and old natural levees
5. PERRY-MORELAND: Poorly drained and somewhat poorly drained, level, deep, clayey soils; on broad flood plains and low terraces
6. MUSKOGEE-WRIGHTSVILLE-MCKAMIE: Moderately well drained, poorly drained, and well drained, level to gently sloping, deep, loamy soils; on terraces

Compiled 1981

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
FOREST SERVICE
ARKANSAS AGRICULTURAL EXPERIMENT STATION

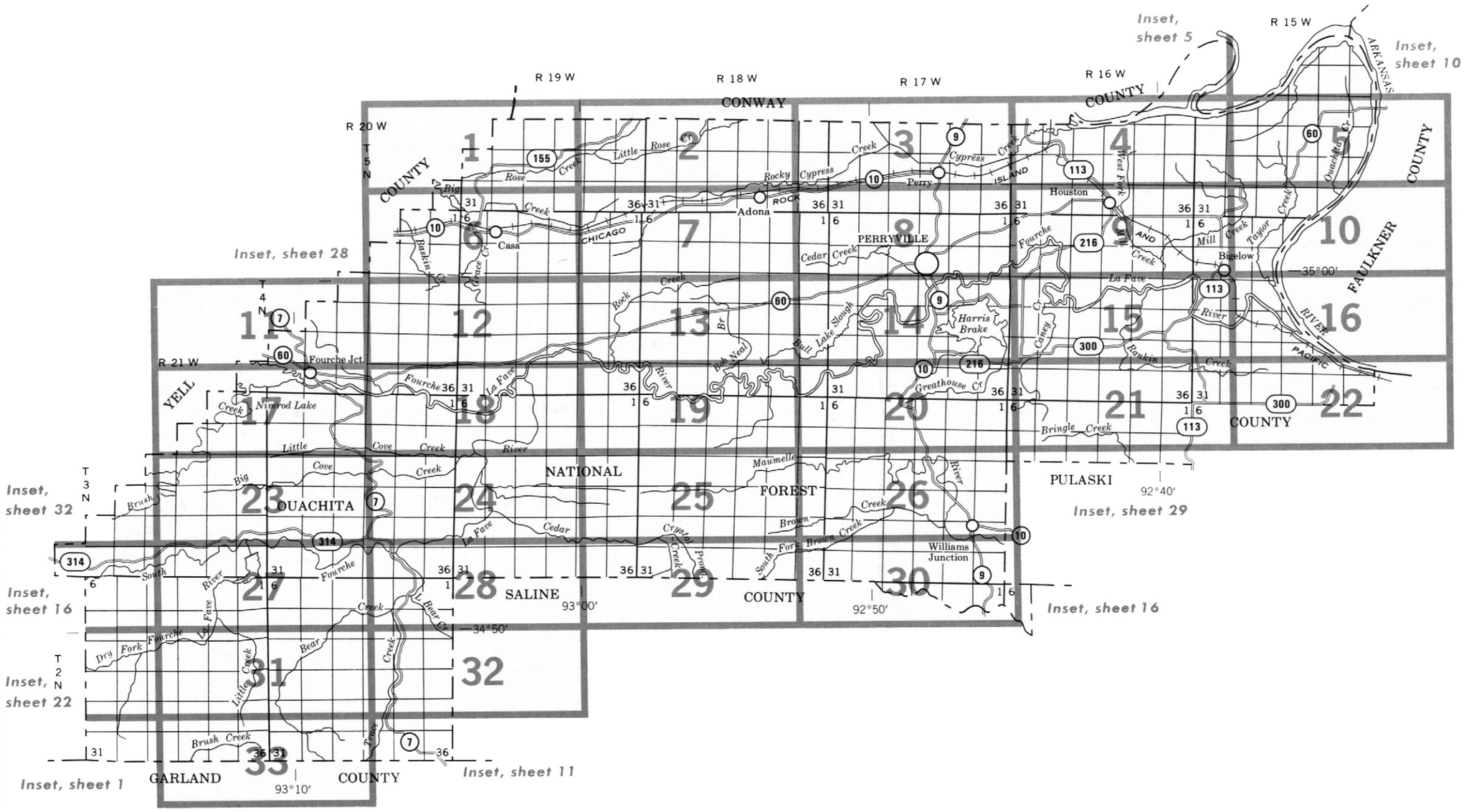
GENERAL SOIL MAP

PERRY COUNTY, ARKANSAS

Scale 1:253,440

1 0 1 2 3 4 Miles

1 0 4 8 Km



SECTIONALIZED TOWNSHIP

6	5	4	3	2	1
7	8	9	10	11	12
18	17	16	15	14	13
19	20	21	22	23	24
30	29	28	27	26	25
31	32	33	34	35	36

Original text from each individual map sheet read:

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of Interior, Geological Survey from 1977 aerial photography. Coordinate grid ticks and land division corners, are approximately positioned.

INDEX TO MAP SHEETS

PERRY COUNTY, ARKANSAS

Scale 1:253,440

1 0 1 2 3 4 Miles

1 0 4 8 Km

SOIL LEGEND

The legend is numeric and the map unit names are in alphabetical order. Soil names that do not give a slope range are for level or nearly level soils on flooded bottom lands. Soil names followed by the superscript 1/ are broadly defined units. The composition of these units is more variable than that of other units in the survey area but has been controlled well enough to be interpreted for the expected use of the soils.

SYMBOL	NAME
1	Allen loam, 3 to 8 percent slopes
2	Barling silt loam, occasionally flooded
3	Cane fine sandy loam, 3 to 8 percent slopes
4	Carnasaw gravelly silt loam, 3 to 8 percent slopes
5	Carnasaw-Pirum association, undulating 1/
6	Carnasaw-Pirum-Clebit association, rolling 1/
7	Carnasaw-Pirum-Clebit association, steep 1/
8	Ceda gravelly loam, frequently flooded
9	Clebit-Carnasaw-Pirum association, very steep 1/
10	Enders gravelly fine sandy loam, 3 to 8 percent slopes
11	Enders gravelly fine sandy loam, 8 to 12 percent slopes
12	Enders stony fine sandy loam, 12 to 20 percent slopes
13	Enders stony fine sandy loam, 20 to 45 percent slopes
14	Gallion silt loam, 0 to 1 percent slopes
15	Guthrie silt loam, occasionally flooded
16	Leadvale silt loam, 1 to 3 percent slopes
17	Leadvale silt loam, 3 to 8 percent slopes
18	Linker fine sandy loam, 3 to 8 percent slopes
19	Linker fine sandy loam, 8 to 12 percent slopes
20	McKamie silt loam, 3 to 8 percent slopes
21	Moreland silty clay, 0 to 1 percent slopes
22	Mountainburg-Rock outcrop complex, 3 to 20 percent slopes
23	Muskogee silt loam, 1 to 3 percent slopes
24	Muskogee silt loam, 3 to 8 percent slopes
25	Perry clay, occasionally flooded
26	Roxana very fine sandy loam, 0 to 1 percent slopes
27	Roxana very fine sandy loam, 1 to 3 percent slopes
28	Sherwood fine sandy loam, 3 to 8 percent slopes
29	Spadra fine sandy loam, 0 to 2 percent slopes
30	Taft silt loam, 0 to 1 percent slopes
31	Wrightsville silt loam, 0 to 1 percent slopes

CONVENTIONAL AND SPECIAL SYMBOLS LEGEND

CULTURAL FEATURES

BOUNDARIES
- National, state or province
- County or parish
- Minor civil division
- Reservation (national forest or park, state forest or park, and large airport)
- Land grant
- Limit of soil survey (label)
- Field sheet matchline & neatline

AD HOC BOUNDARY (label)
- Small airport, airfield, park, oilfield, cemetery, or flood pool (Hedley Airstrip; FLOOD POOL LINE)

STATE COORDINATE TICK

LAND DIVISION CORNERS (sections and land grants)

ROADS
- Divided (median shown if scale permits)
- Other roads
- Trail

ROAD EMBLEM & DESIGNATIONS
- Interstate (21)
- Federal (178)
- State (28)
- County, farm or ranch (1283)

RAILROAD

POWER TRANSMISSION LINE (normally not shown)

PIPE LINE (normally not shown)

FENCE (normally not shown)

LEVEES
- Without road
- With road
- With railroad

DAMS
- Large (to scale)
- Medium or small (water; w)

PITS
- Gravel pit
- Mine or quarry

MISCELLANEOUS CULTURAL FEATURES
- Farmstead, house (omit in urban areas)
- Church
- School
- Indian mound (label) (Indian Mound)
- Located object (label) (Tower)
- Tank (label) (Gas)
- Wells, oil or gas
- Windmill
- Kitchen midden

WATER FEATURES

DRAINAGE
- Perennial, double line
- Perennial, single line
- Intermittent
- Drainage end
- Canals or ditches
  - Double-line (label) (CANAL)
  - Drainage and/or irrigation

LAKES, PONDS AND RESERVOIRS
- Perennial (water; w)
- Intermittent (int; i)

MISCELLANEOUS WATER FEATURES
- Marsh or swamp
- Spring
- Well, artesian
- Well, irrigation
- Wet spot

SPECIAL SYMBOLS FOR SOIL SURVEY

SOIL DELINEATIONS AND SYMBOLS (6, 7)

ESCARPMENTS
- Bedrock (points down slope)
- Other than bedrock (points down slope)

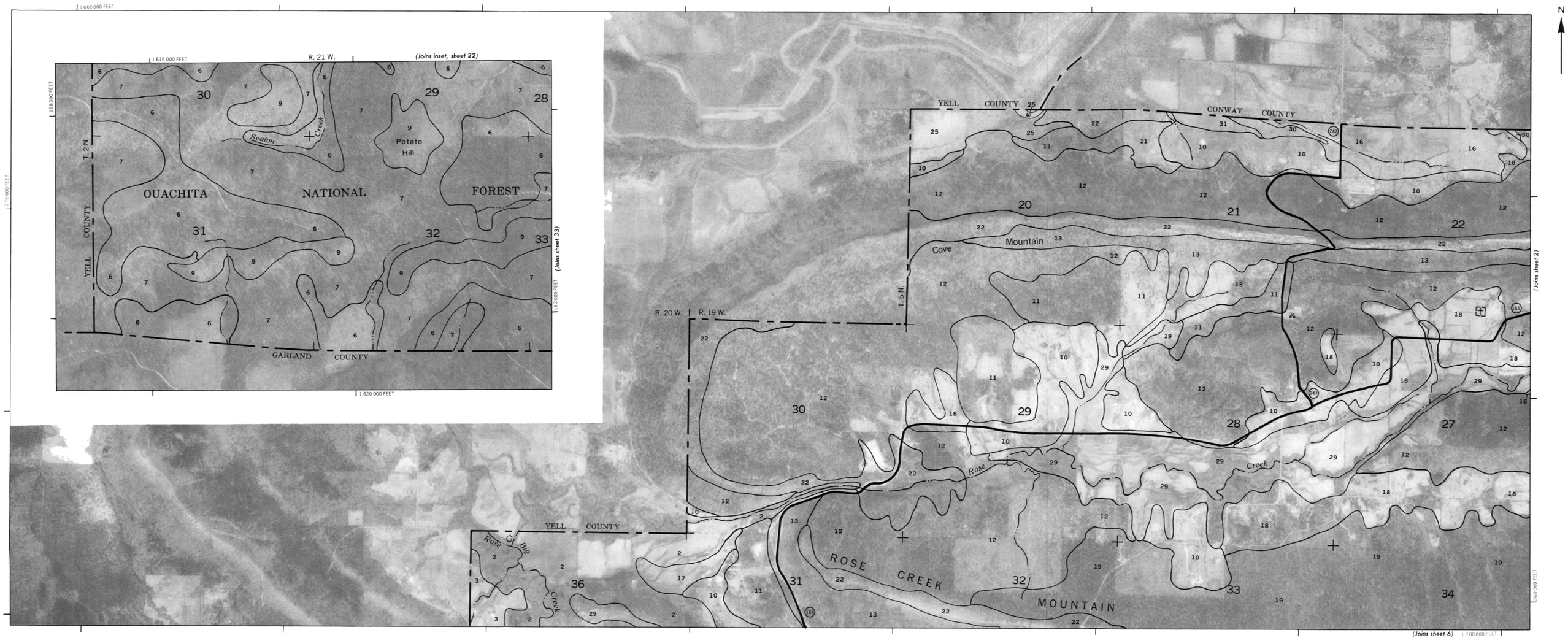
SHORT STEEP SLOPE

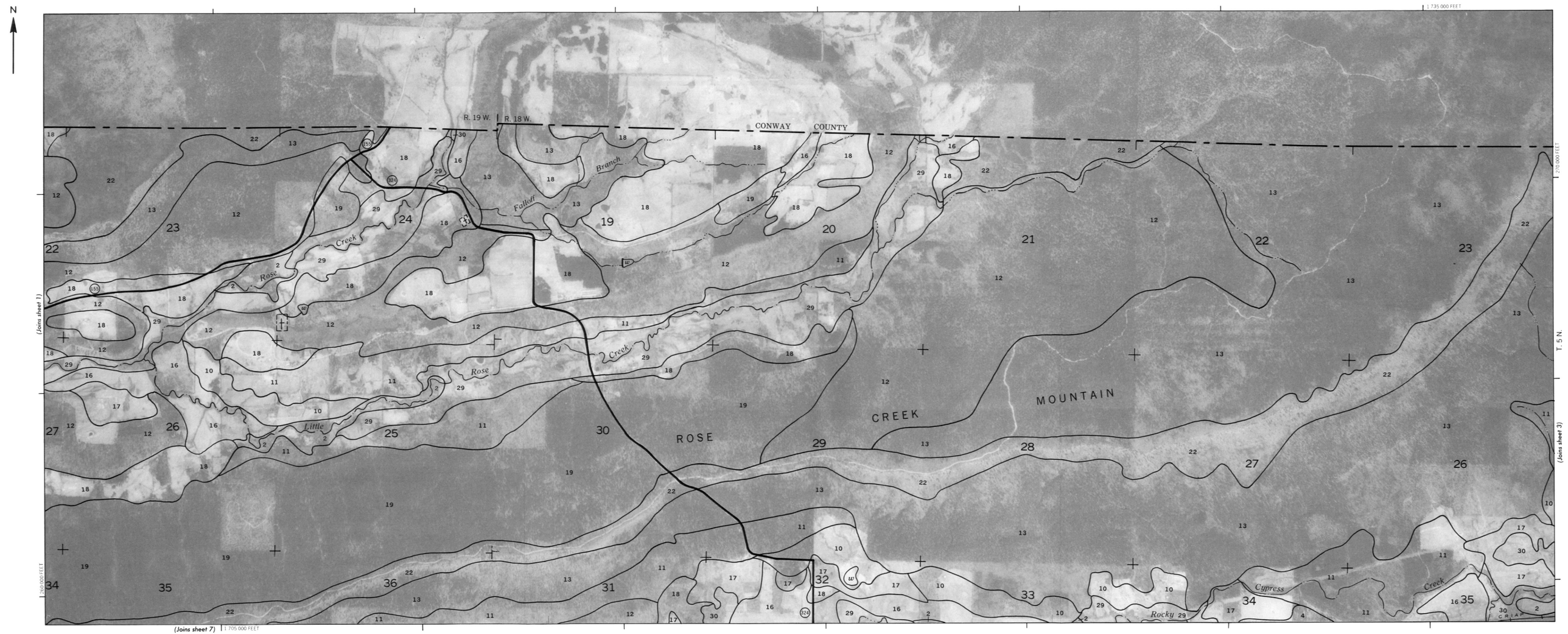
GULLY

DEPRESSION OR SINK

SOIL SAMPLE SITE (normally not shown)

MISCELLANEOUS
- Blowout
- Clay spot
- Gravelly spot
- Gumbo, slick or scabby spot (sodic)
- Dumps and other similar non soil areas
- Prominent hill or peak
- Rock outcrop (includes sandstone and shale)
- Saline spot
- Sandy spot
- Severely eroded spot
- Slide or slip (tips point upslope)
- Stony spot, very stony spot


1 665 000 FEET
1 615 000 FEET
R. 21 W.
(Joins inset, sheet 22)
168 000 FEET
T. 2 N.
YELL COUNTY
OUACHITA NATIONAL FOREST
Seaton Creek
Potato Hill
30
29
28
31
32
33
GARLAND COUNTY
1 620 000 FEET
(Joins sheet 33)
163 000 FEET
270 000 FEET
R. 20 W.
R. 19 W.
T. 5 N.
YELL COUNTY
CONWAY COUNTY
Cove Mountain
20
21
22
Rose Creek
ROSE CREEK MOUNTAIN
Big Rose Creek
36
31
32
33
34
27
(Joins sheet 2)
(Joins sheet 6)
1 700 000 FEET
620 000 FEET
N
5000 4000 3000 2000 1000 0 5000 Feet
1 .5 0 1 Kilometer
Scale - 1:20000


N
R. 19 W.
R. 18 W.
CONWAY COUNTY
Branch
Falloff
Creek
Rose
Creek
Rose
Little
ROSE
CREEK
MOUNTAIN
Cypress
Creek
Rocky
(Joins sheet 1)
(Joins sheet 3)
(Joins sheet 7)
1 735 000 FEET
1 705 000 FEET
270 000 FEET
260 000 FEET
T. 5 N.
5000 4000 3000 2000 1000 0 5000 Feet
1 .5 0 1 Kilometer
Scale - 1:20000

PERRY COUNTY, ARKANSAS — SHEET NUMBER 3

3

N

1 740 000 FEET

270 000 FEET

R. 18 W. | R. 17 W.

CONWAY COUNTY

Rose Creek Mountain

Fidl

Cypress Creek

Cypress Creek

Cypress Creek

Rocky

water

water

water

CHICAGO ROCK ISLAND AND PACIFIC

Perry

(Joins sheet 2)

(Joins sheet 4)

(Joins sheet 8)

T. 4 N. | T. 5 N.

280 000 FEET

1 775 000 FEET

R. 17 W. | R. 16 W.

5000 4000 3000 2000 1000 0 5000 Feet

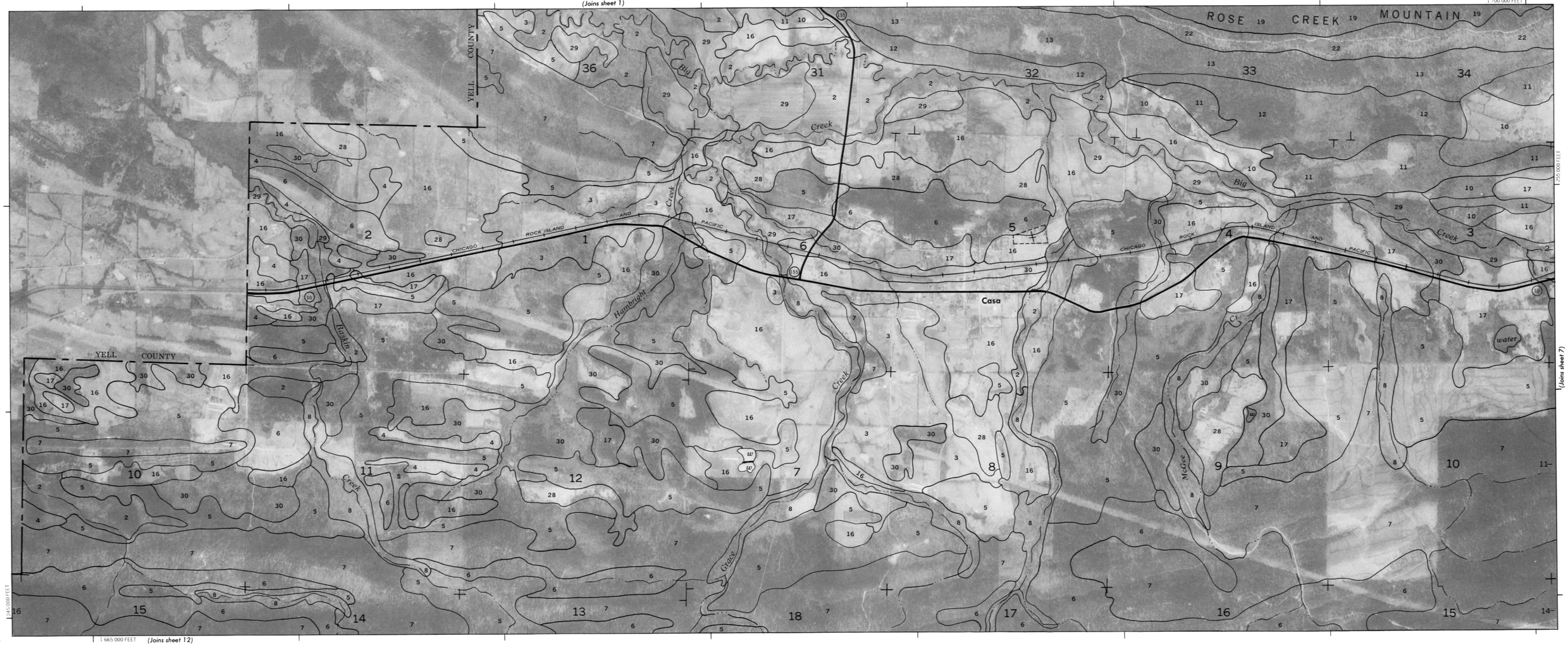
1 .5 0 1 Kilometer

Scale - 1:20000


N
R. 16 W. | R. 15 W.
(Joins inset, sheet 5)
1 810 000 FEET
ARKANSAS RIVER
Morrilton Cutoff
CONWAY COUNTY
CONWAY COUNTY
Cypress Creek
water
White River
Branch
Bunker Hill
Ballard Creek
CHICAGO ROCK ISLAND AND PACIFIC
TOMS MOUNTAIN
West Fork
MOUNTAIN
PERRY
Copperas Gap
T. 5 N.
(Joins sheet 3)
(Joins sheet 5)
(Joins sheet 9)
1 780 000 FEET
270 000 FEET
260 000 FEET
R. 16 W. | R. 15 W.
5000 4000 3000 2000 1000 0 5000 Feet
1 .5 0 1 Kilometer
Scale - 1:20000

PERRY COUNTY, ARKANSAS — SHEET NUMBER 5

PERRY COUNTY, ARKANSAS — SHEET NUMBER 6



PERRY COUNTY, ARKANSAS — SHEET NUMBER 7

7

N

1 705 000 FEET

R. 19 W. | R. 18 W.

(Joins sheet 2)

T. 4 N. | T. 5 N.

255 000 FEET

(Joins sheet 6)

(Joins sheet 8)

Homewood

Adona

Big Creek

Mulberry Creek

Rocky Cypress Creek

Danner Creek

Howell Creek

CHICAGO ROCK ISLAND AND PACIFIC

water

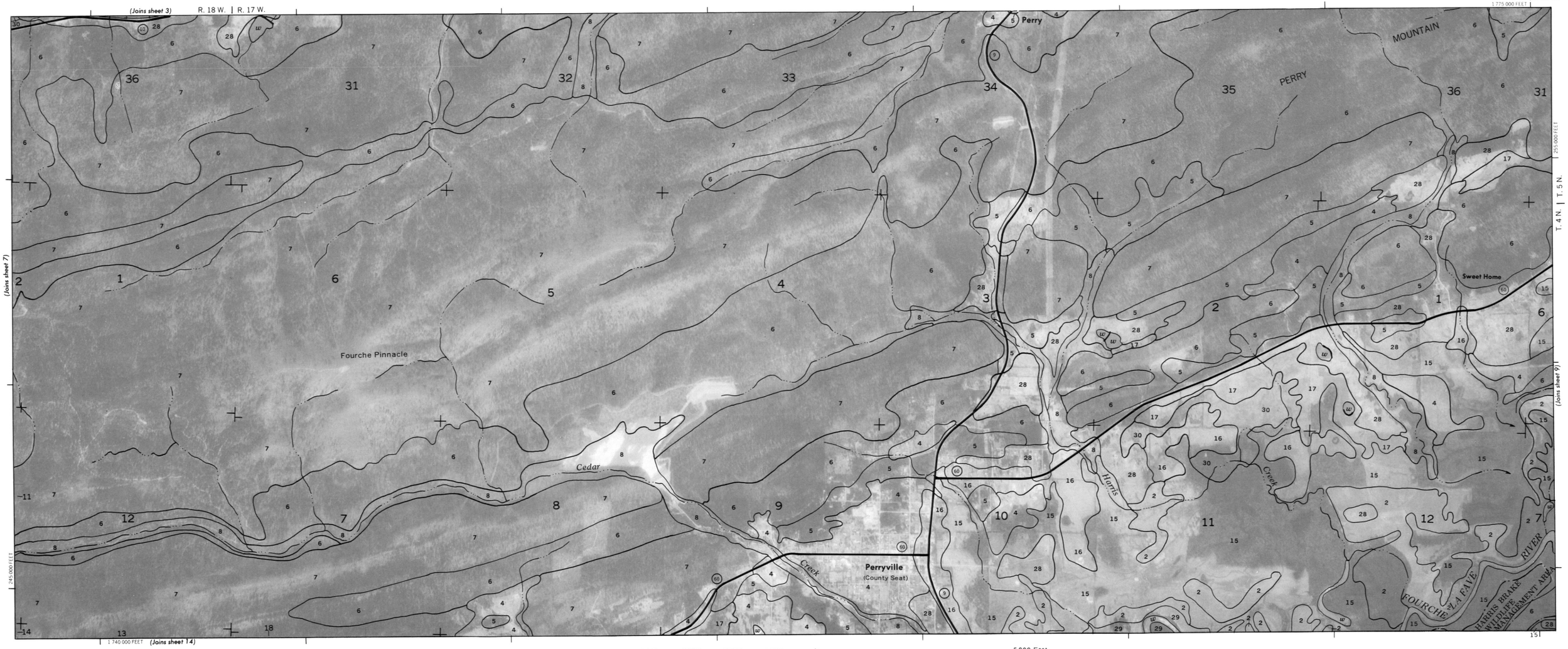
(Joins sheet 13)

1 735 000 FEET

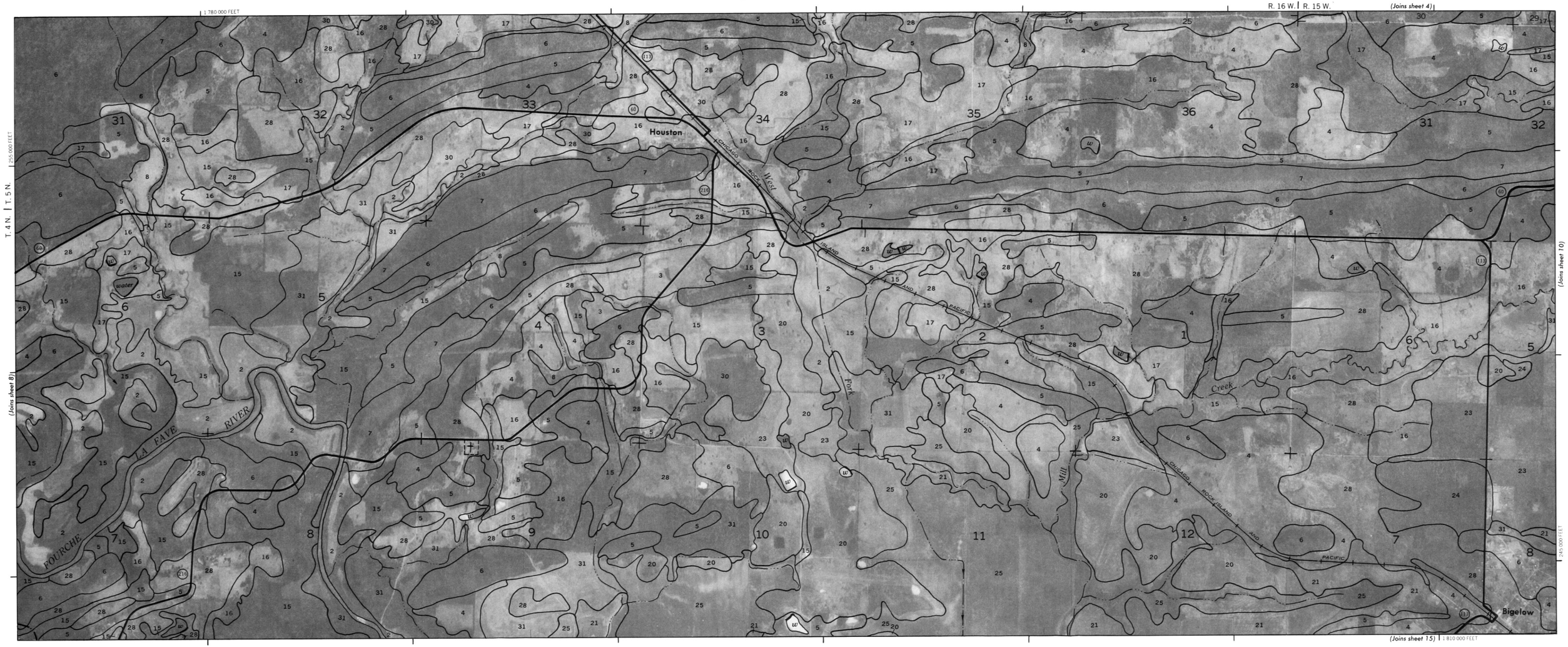
5000 4000 3000 2000 1000 0 5000 Feet

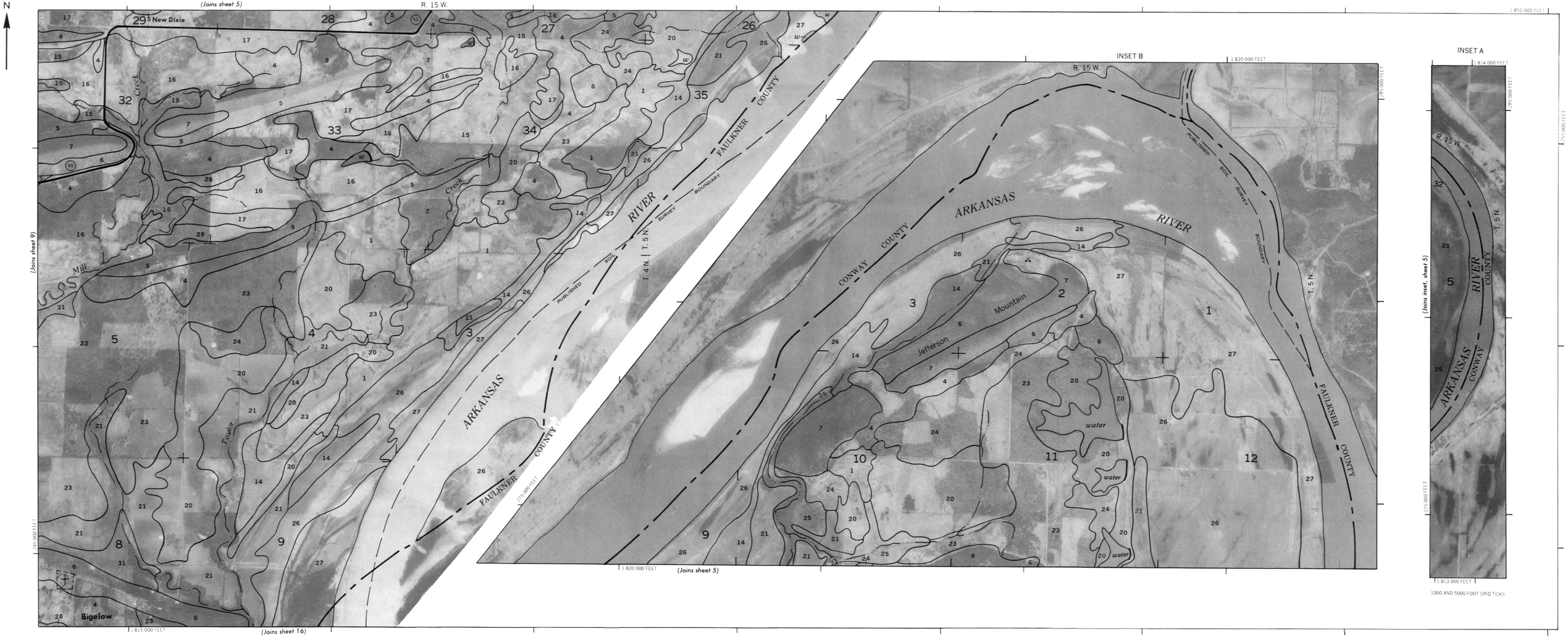
1 .5 0 1 Kilometer

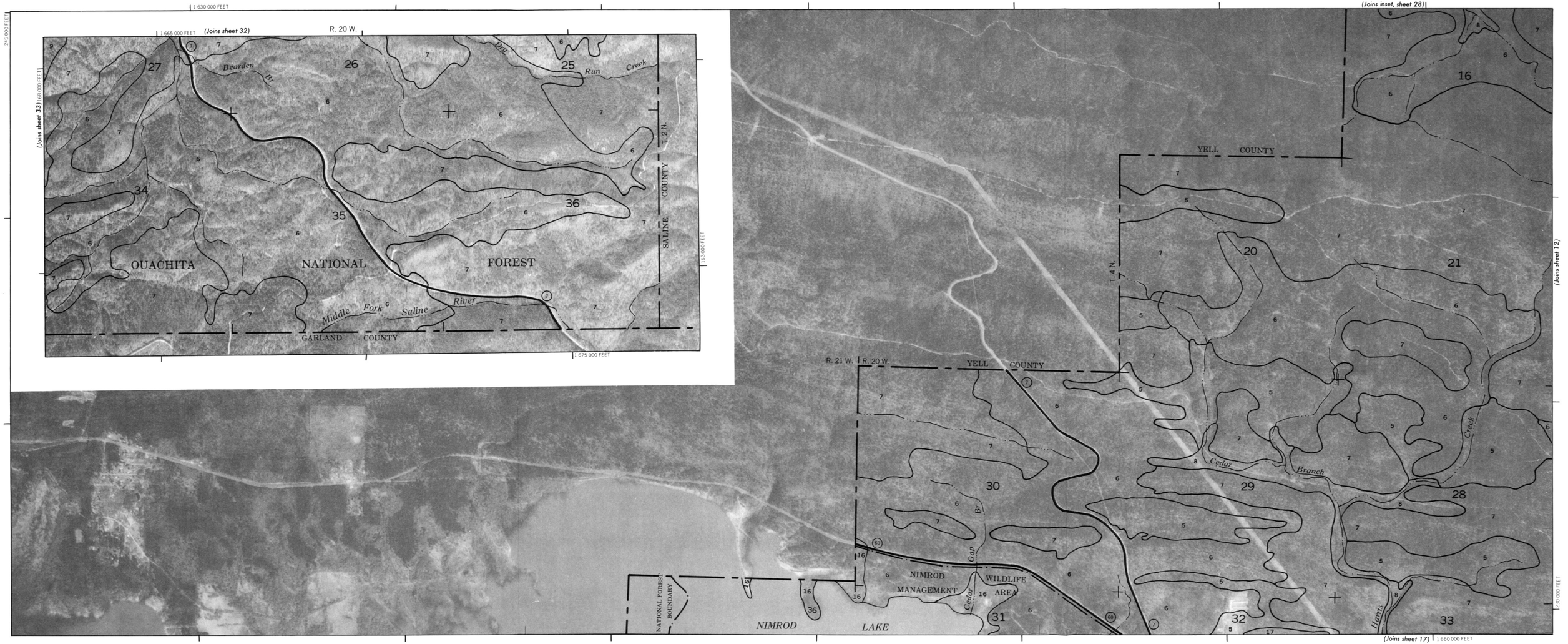
Scale - 1:20000


N
(Joins sheet 3)
R. 18 W.
R. 17 W.
R. 17 W.
R. 16 W.
1 775 000 FEET
T. 4 N.
T. 5 N.
255 000 FEET
245 000 FEET
(Joins sheet 7)
(Joins sheet 9)
1 740 000 FEET
(Joins sheet 14)
Perry
MOUNTAIN
PERRY
Sweet Home
Fourche Pinnacle
Cedar
Creek
Harris
Creek
Perryville
(County Seat)
FOURCHE LA FAVE
RIVER
HARRIS BRAKE
WILDLIFE
MANAGEMENT AREA
5 000 4 000 3 000 2 000 1 000 0 5 000 Feet
1 .5 0 1 Kilometer
Scale - 1:20000

PERRY COUNTY, ARKANSAS — SHEET NUMBER 9

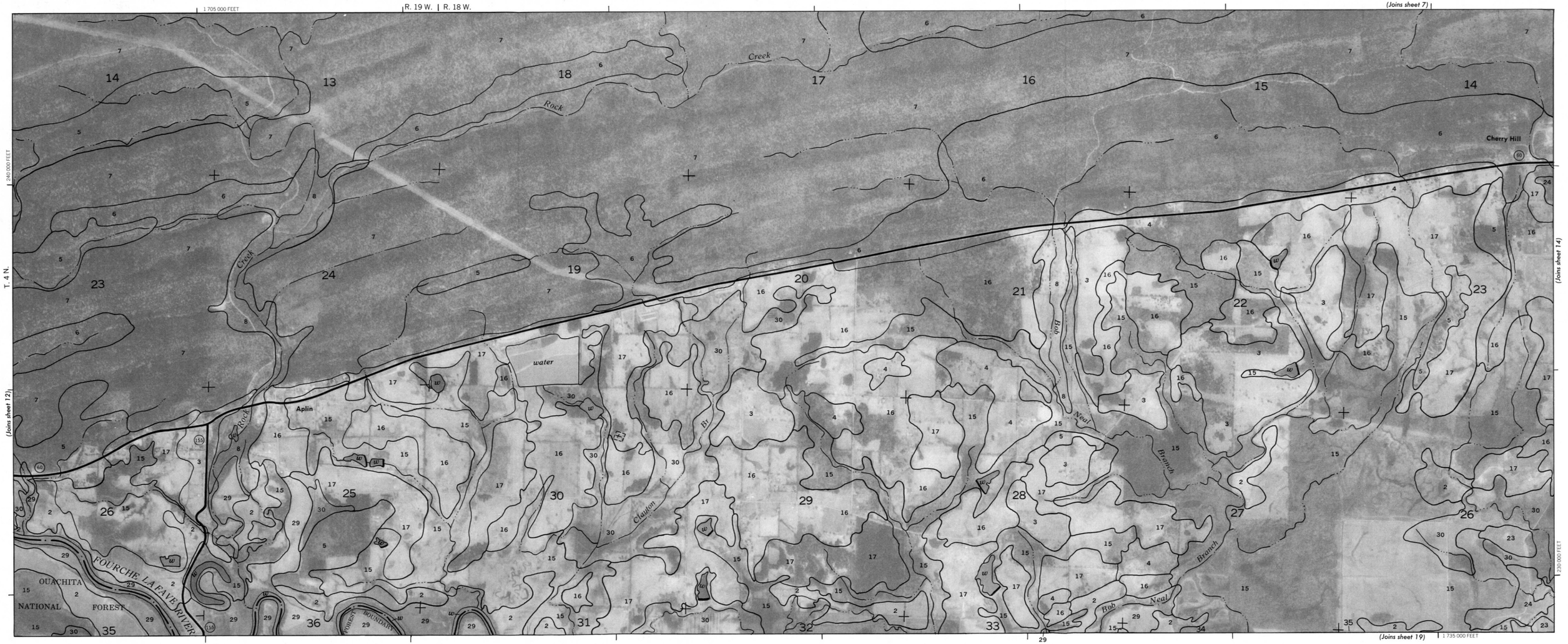



(10)
N
(Joins sheet 5)
R. 15 W.
1 850 000 FEET
INSET B
1 835 000 FEET
INSET A
1 814 000 FEET
New Dixie
Creek
Mill
Taylor
Bigelow
FAULKNER COUNTY
ARKANSAS RIVER
CONWAY COUNTY
PUBLISHED SOIL SURVEY BOUNDARY
T. 4 N.
T. 5 N.
Mountain
Jefferson
water
(Joins sheet 9)
(Joins sheet 16)
(Joins inset, sheet 5)
1 820 000 FEET
1 815 000 FEET
1 813 000 FEET
285 000 FEET
275 000 FEET
1000 AND 5000-FOOT GRID TICKS
5000 4000 3000 2000 1000 0 5000 Feet
1 .5 0 1 Kilometer
Scale - 1:20000


1 630 000 FEET
1 665 000 FEET
(Joins sheet 32)
R. 20 W.
(Joins inset, sheet 28)
245 000 FEET
(Joins sheet 33) 168 000 FEET
165 000 FEET
230 000 FEET
(Joins sheet 12)
(Joins sheet 17) 1 660 000 FEET
1 675 000 FEET
N
27
26
25
34
35
36
Bearden Br
Dry Run Creek
T. 2 N.
SALINE COUNTY
OUACHITA NATIONAL FOREST
Middle Fork Saline River
GARLAND COUNTY
YELL COUNTY
T. 4 N.
20
21
16
R. 21 W.
R. 20 W.
30
29
28
31
32
33
Cedar Branch Creek
Gap Br
NIMROD MANAGEMENT AREA
WILDLIFE
NATIONAL FOREST BOUNDARY
NIMROD LAKE
Harris
5000 4000 3000 2000 1000 0 5000 Feet
1 .5 0 1 Kilometer
Scale - 1:20000

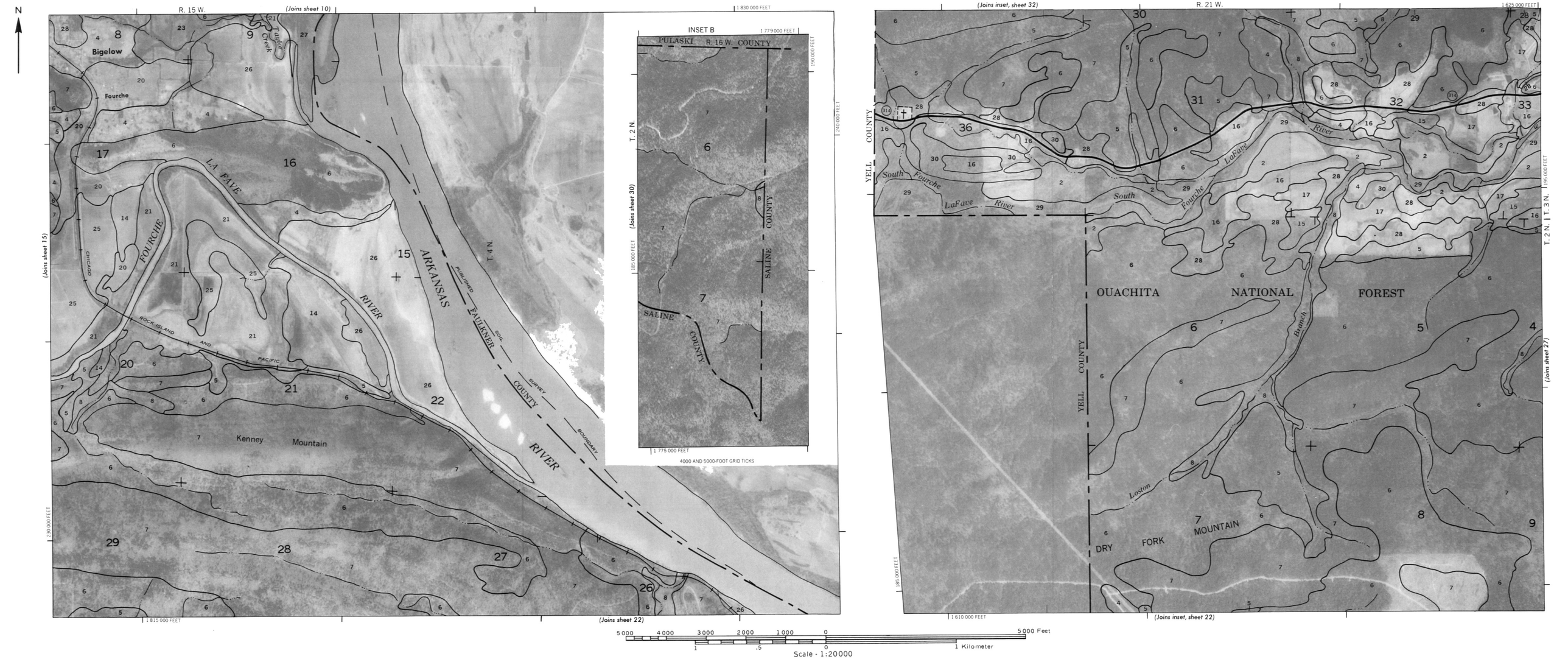

12
N
(Joins sheet 6)
R. 20 W.
R. 19 W.
1 700 000 FEET
240 000 FEET
T. 4 N.
(Joins sheet 11)
(Joins sheet 13)
230 000 FEET
1 665 000 FEET
(Joins sheet 18)
Wallace Creek
Cherry Branch
White Creek
LA FAVE RIVER
FOURCHE
OUACHITA NATIONAL 15 FOREST
Nimrod
5 000 4 000 3 000 2 000 1 000 0 5 000 Feet
1 .5 0 1 Kilometer
Scale - 1:20000

PERRY COUNTY, ARKANSAS — SHEET NUMBER 13




N
(Joins sheet 8) R. 18 W.
R. 17 W.
R. 17 W.
R. 16 W.
1 775 000 FEET
Perryville
(county seat)
Cherry Hill
LA FAVE
RIVER
FOURCHE
Cedar Cr.
Coffee
water
int
HARRIS
BRAKE
WILDLIFE
MANAGEMENT
AREA
Slough
Bend
Calfneck
Horseshoe
Bend
Millie Bluff
Lake
Bull
Clear
Lake
Tyndall
Greenhouse Creek
T. 4 N.
(Joins sheet 13)
(Joins sheet 15)
7 520 000 FEET
260 000 FEET
1 740 000 FEET
(Joins sheet 20)
5 000 4 000 3 000 2 000 1 000 0 5 000 Feet
1 .5 0 1 Kilometer
Scale - 1:20000


1 780 000 FEET
R. 16 W.
R. 15 W.
(Joins sheet 9)
15
N
Bigelow
Winford Brake
int
Mill Creek
Turkey Swamp
int
LA FAVE
RIVER
FOURCHE
water
Open Lake
Creek
Pleasant Valley
Rankin
Coney
Creek
water
T. 4 N.
240 000 FEET
(Joins sheet 14)
(Joins sheet 16)
250 000 FEET
(Joins sheet 21)
1 810 000 FEET
5000 4000 3000 2000 1000 0 5000 Feet
1 .5 0 1 Kilometer
Scale - 1:20000


N
R. 15 W.
(Joins sheet 10)
Bigelow
Fourche
Taylor Creek
LA FAVE
FOURCHE
CHICAGO
ROCK ISLAND AND PACIFIC
RIVER
ARKANSAS
PUBLISHED
FAULKNER
SOIL
SURVEY
COUNTY
RIVER
Kenney
Mountain
N. 1 T.
(Joins sheet 15)
(Joins sheet 22)
1 830 000 FEET
1 815 000 FEET
230 000 FEET
INSET B
1 779 000 FEET
PULASKI
R. 16 W.
COUNTY
T. 2 N.
(Joins sheet 30)
190 000 FEET
185 000 FEET
240 000 FEET
SALINE
COUNTY
1 775 000 FEET
4000 AND 5000-FOOT GRID TICKS
INSET A
(Joins inset, sheet 32)
R. 21 W.
1 625 000 FEET
YELL
COUNTY
South Fourche LaFave River
LaFave River
South Fourche
OUACHITA
NATIONAL
FOREST
Branch
Loston
DRY
FORK
MOUNTAIN
T. 2 N.
T. 3 N.
195 000 FEET
185 000 FEET
1 610 000 FEET
(Joins sheet 27)
(Joins inset, sheet 22)
5 000
4 000
3 000
2 000
1 000
0
5 000 Feet
1
.5
0
1 Kilometer
Scale - 1:20000

PERRY COUNTY, ARKANSAS — SHEET NUMBER 17


N
(Joins sheet 12)
R. 20 W.
R. 19 W.
T. 3 N.
T. 4 N.
(Joins sheet 17)
(Joins sheet 19)
(Joins sheet 24)
Nimrod
Deberrie
Cherry Creek
Harris Creek
Wallace Creek
FOURCHE LA FAVE RIVER
White Cr.
Whiskey Creek
Long Hollow
Caney Creek
Little Cove Creek
South Fourche LaFave River
Brushy Hollow
OUACHITA NATIONAL FOREST
Scale - 1:20000

PERRY COUNTY, ARKANSAS — SHEET NUMBER 19

19

N

R. 19 W. | R. 18 W.

T. 3 N. | T. 4 N.

(Joins sheet 13)

(Joins sheet 18)

(Joins sheet 20)

(Joins sheet 25)

OUACHITA NATIONAL FOREST

FOURCHE LA FAVE RIVER

Ragsdale

Huston Creek

Rock Creek

Brushy Hollow

Bug

Claytons Br

Bob Neal Br

5000 4000 3000 2000 1000 0 5000 Feet

1 .5 0 1 Kilometer

Scale - 1:20000


N
(Joins sheet 14) R. 18 W.
R. 17 W.
R. 17 W.
R. 16 W.
1 775 000 FEET
RIVER
Slaty Bluff
LA FAVE
FOURCHE
Watson Bluff
Creek
Huston
Little
MOUNTAIN
LINK
OUACHITA
NATIONAL
FOREST
Greathouse
Creek
Thornburg
Bell
Branch
water
Lyons
Branch
(Joins sheet 19)
(Joins sheet 21)
T. 3 N. | T. 4 N.
225 000 FEET
215 000 FEET
1 740 000 FEET
(Joins sheet 26)
5000 4000 3000 2000 1000 0 5000 Feet
1 .5 0 1 Kilometer
Scale - 1:20000

PERRY COUNTY, ARKANSAS — SHEET NUMBER 21

5000 4000 3000 2000 1000 0 5000 Feet

1 .5 0 1 Kilometer

Scale - 1:20000

PERRY COUNTY, ARKANSAS — SHEET NUMBER 23

R. 21 W. | R. 20 W.

1 630 000 FEET

(Joins sheet 17)

23

N

FOURCHE MOUNTAIN

Guest Branch

Mountain Cove

Creek

Big Cove Creek

Brush Creek

South Fourche LaFave River

OUACHITA NATIONAL FOREST

T. 3 N.

(Joins inset, sheet 32)

(Joins sheet 24)

210 000 FEET

200 000 FEET

(Joins sheet 27)

1 660 000 FEET

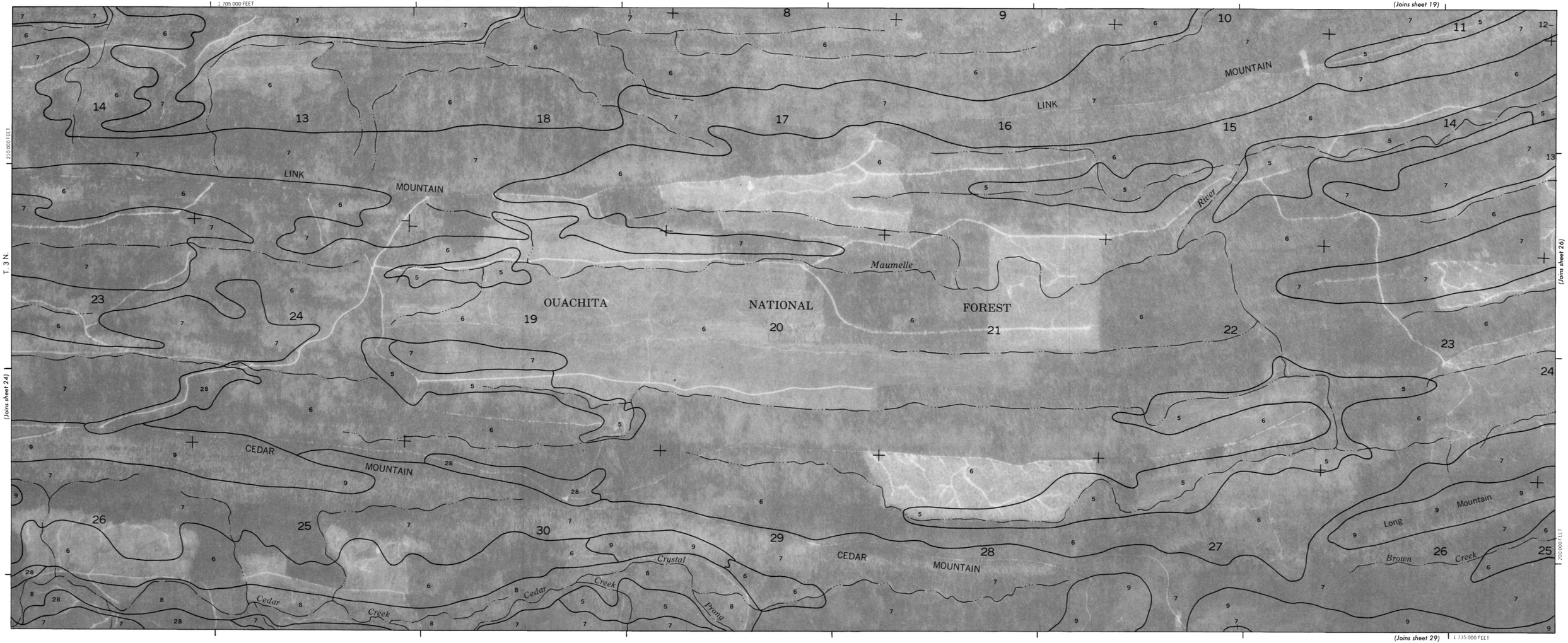
5000 4000 3000 2000 1000 0 5000 Feet

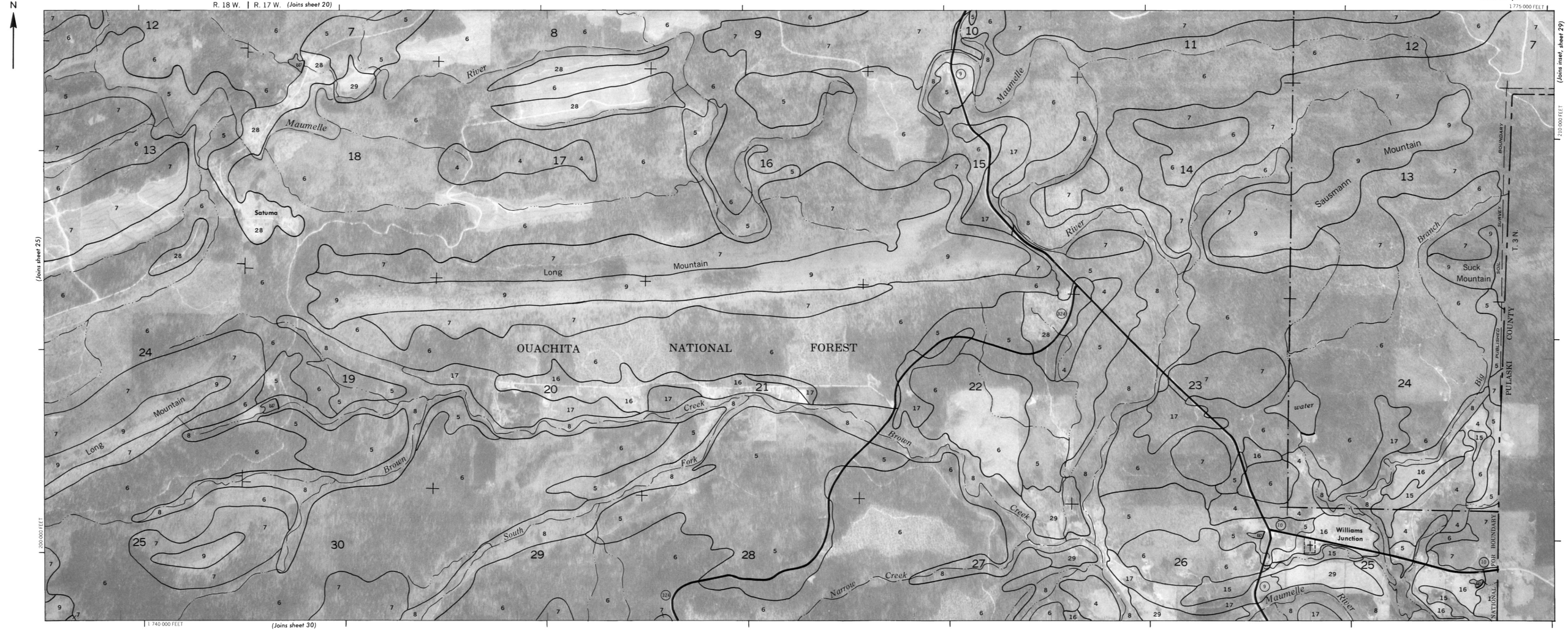
1 .5 0 1 Kilometer

Scale - 1:20000


N
(Joins sheet 18)
R. 20 W.
R. 19 W.
1 700 000 FEET
(Joins sheet 23)
T. 3 N.
(Joins sheet 25)
1 700 000 FEET
1 665 000 FEET
(Joins sheet 28)
Little Cove Creek
Big Cove Creek
La Fave River
South Fourche
Fourche La Fave River
Cedar Creek
Little Cedar Creek
Magie Creek
Goat Bluff
South Fourche
OUACHITA NATIONAL FOREST
LINK MOUNTAIN
CEDAR MOUNTAIN
Hollis
5000 4000 3000 2000 1000 0 5000 Feet
1 .5 0 1 Kilometer
Scale - 1:20000

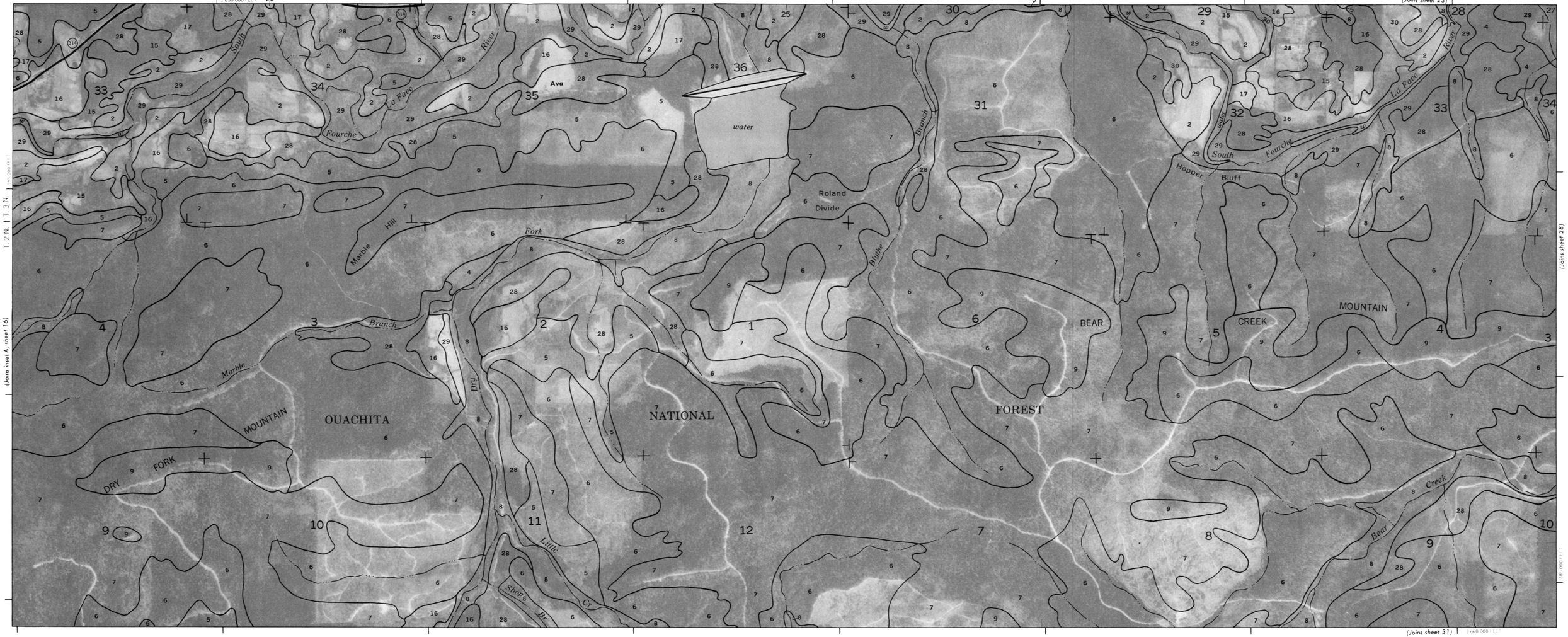
PERRY COUNTY, ARKANSAS — SHEET NUMBER 25




N
R. 18 W.
R. 17 W. (Joins sheet 20)
R. 17 W.
R. 16 W.
1 775 000 FEET
2 210 000 FEET
(Joins inset, sheet 29)
(Joins sheet 25)
2 200 000 FEET
1 740 000 FEET
(Joins sheet 30)
River
Maumelle
Satuma
Long
Mountain
OUACHITA
NATIONAL
FOREST
Brown
Creek
Fork
South
Narrow
Sausmann
Branch
Big
Suck
Mountain
water
Williams
Junction
PULASKI COUNTY
T. 3 N.
NATIONAL FOR. BOUNDARY
SURVEY BOUNDARY
SOIL
PUBLISHED
5000 4000 3000 2000 1000 0 5000 Feet
1 .5 0 1 Kilometer
Scale - 1:20000

PERRY COUNTY, ARKANSAS — SHEET NUMBER 27

R. 21 W. | R. 20 W.



5000 4000 3000 2000 1000 0 5000 Feet

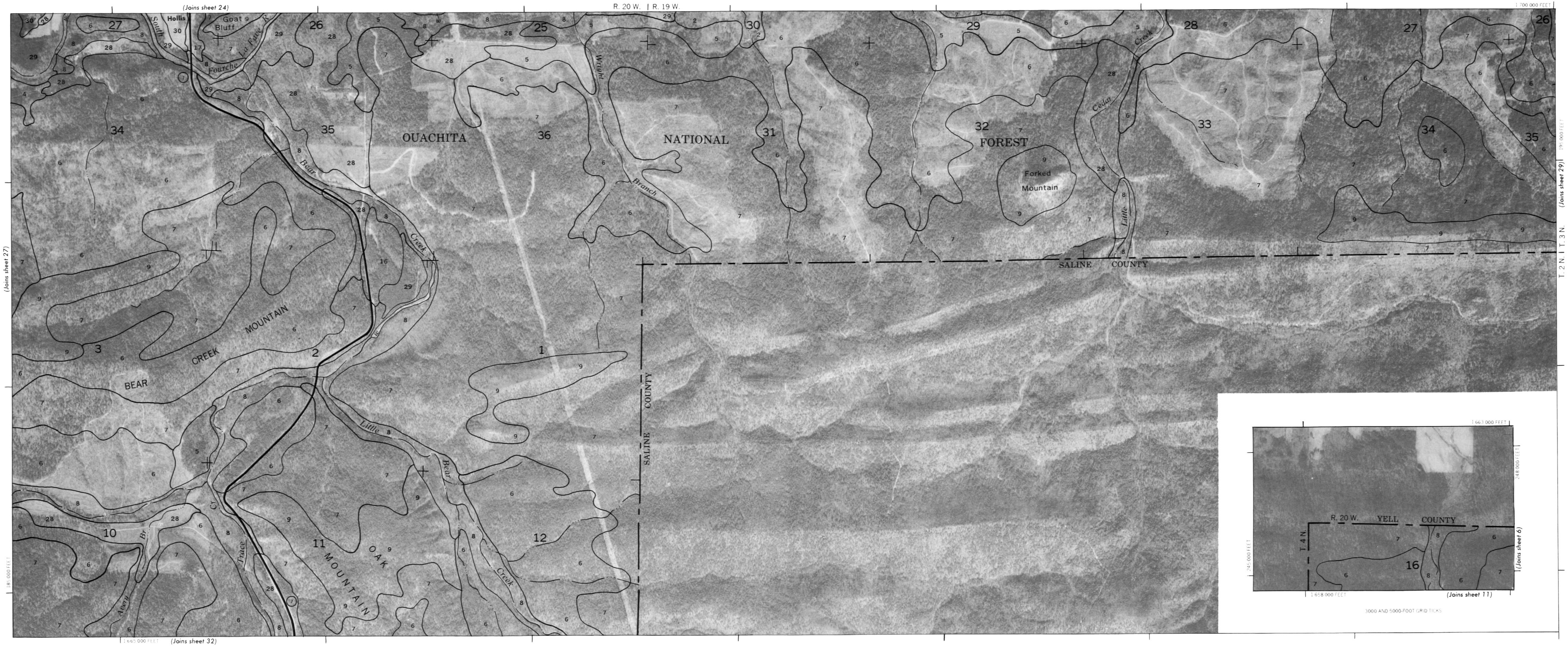
1 .5 0 1 Kilometer

Scale · 1:20000

27

N

(28)



N

5000 4000 3000 2000 1000 0 5000 Feet

1 .5 0 1 Kilometer

Scale - 1:20000

PERRY COUNTY, ARKANSAS — SHEET NUMBER 29

29

N

R. 19 W. | R. 18 W.

1 705 000 FEET

(Joins sheet 25)

T. 3 N.

(Joins sheet 28) | 195 000 FEET

(Joins sheet 30)

OUACHITA NATIONAL FOREST

Cedar Cr

Cedar Creek

Crystal

Pronty

Flatside Pinnacle

South Fork Brown Creek

SALINE COUNTY

R. 16 W.

1 780 000 FEET

(Joins sheet 21)

(Joins sheet 26)

211 000 FEET

Bringle Creek

PUBLISHED SOIL SURVEY BOUNDARY

PULASKI COUNTY

T. 3 N.

185 000 FEET

1 805 000 FEET

2000 AND 5000-FOOT GRID TICKS

1 735 000 FEET

5000 4000 3000 2000 1000 0 5000 Feet

1 .5 0 1 Kilometer

Scale - 1:20000


N
R. 18 W.
R. 17 W. (Joins sheet 26)
(Joins sheet 29)
1 775 000 FEET
1 740 000 FEET
385 000 FEET
395 000 FEET
T. 3 N.
T. 2 N.
OUACHITA
NATIONAL
FOREST
Lake Sylvia
Narrow Creek
Maumelle R.
South Fork Broten Cr.
North Fork Pinnacle
N. Fork Saline River
Chinquapin Mountain
Nancy Mountain
Wildcat Mountain
Round Mountain
SALINE COUNTY
PULASKI COUNTY
BOUNDARY
NATIONAL FOREST
(Joins inset B, sheet 16)
5 000 4 000 3 000 2 000 1 000 0 5 000 Feet
1 .5 0 1 Kilometer
Scale - 1:20000

PERRY COUNTY, ARKANSAS — SHEET NUMBER 31

R. 21 W. | R. 20 W.

1 625 000 FEET

(Joins sheet 27)

N

T. 2 N.

380 000 FEET

(Joins inset, sheet 22)

(Joins sheet 32)

170 000 FEET

(Joins sheet 33)

1 660 000 FEET

OUACHITA NATIONAL FOREST

Dru Fork

Caney Creek

Shop Branch

Little Creek

Bear Creek

Hickory Creek Hollow

Joe Point

Deckard

NORTH DECKARD MOUNTAIN

Branch

MOUNTAIN

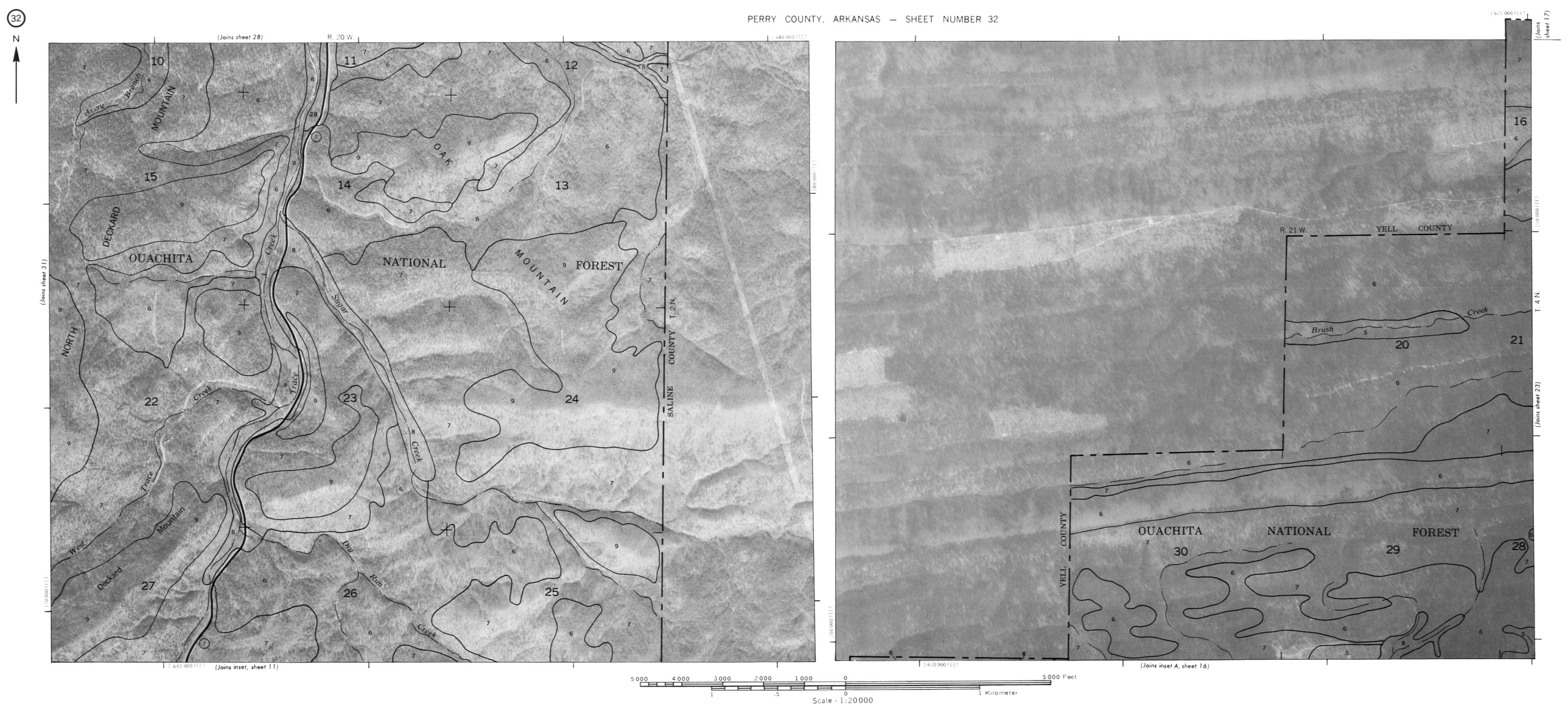
LOCUST MOUNTAIN

West Prong

5000 4000 3000 2000 1000 0 5000 Feet

1 .5 0 1 Kilometer

Scale - 1:20000


N
(Joins sheet 28)
R. 20 W.
(Joins sheet 31)
(Joins sheet 17)
T. 2 N.
T. 4 N.
R. 21 W.
YELL COUNTY
SALINE COUNTY
OUACHITA NATIONAL FOREST
MOUNTAIN
OAK
DECKARD
NORTH
Sugar Creek
Brush Creek
Trace Creek
Dry Run Creek
West Deckard Mountain Trace
Atory Branch
10
11
12
13
14
15
16
20
21
22
23
24
25
26
27
28
29
30
(Joins inset, sheet 11)
(Joins inset A, sheet 16)
(Joins sheet 23)
680 000 FEET
665 000 FEET
625 000 FEET
610 000 FEET
5000 4000 3000 2000 1000 0 5000 Feet
1 .5 0 1 Kilometer
Scale - 1:20000

PERRY COUNTY, ARKANSAS — SHEET NUMBER 33

R. 21 W. | R. 20 W.

33

N

1 625 000 FEET

(Joins sheet 31)

T. 2 N.

1 650 000 FEET

(Joins inset, sheet 11)

(Joins inset, sheet 11)

OUACHITA NATIONAL FOREST

Bear Creek

Deckard Mountain

Brush Creek

BRUSHY MOUNTAIN

GARLAND COUNTY

1 660 000 FEET

5000 4000 3000 2000 1000 0 5000 Feet

1 .5 0 1 Kilometer

Scale - 1:20000